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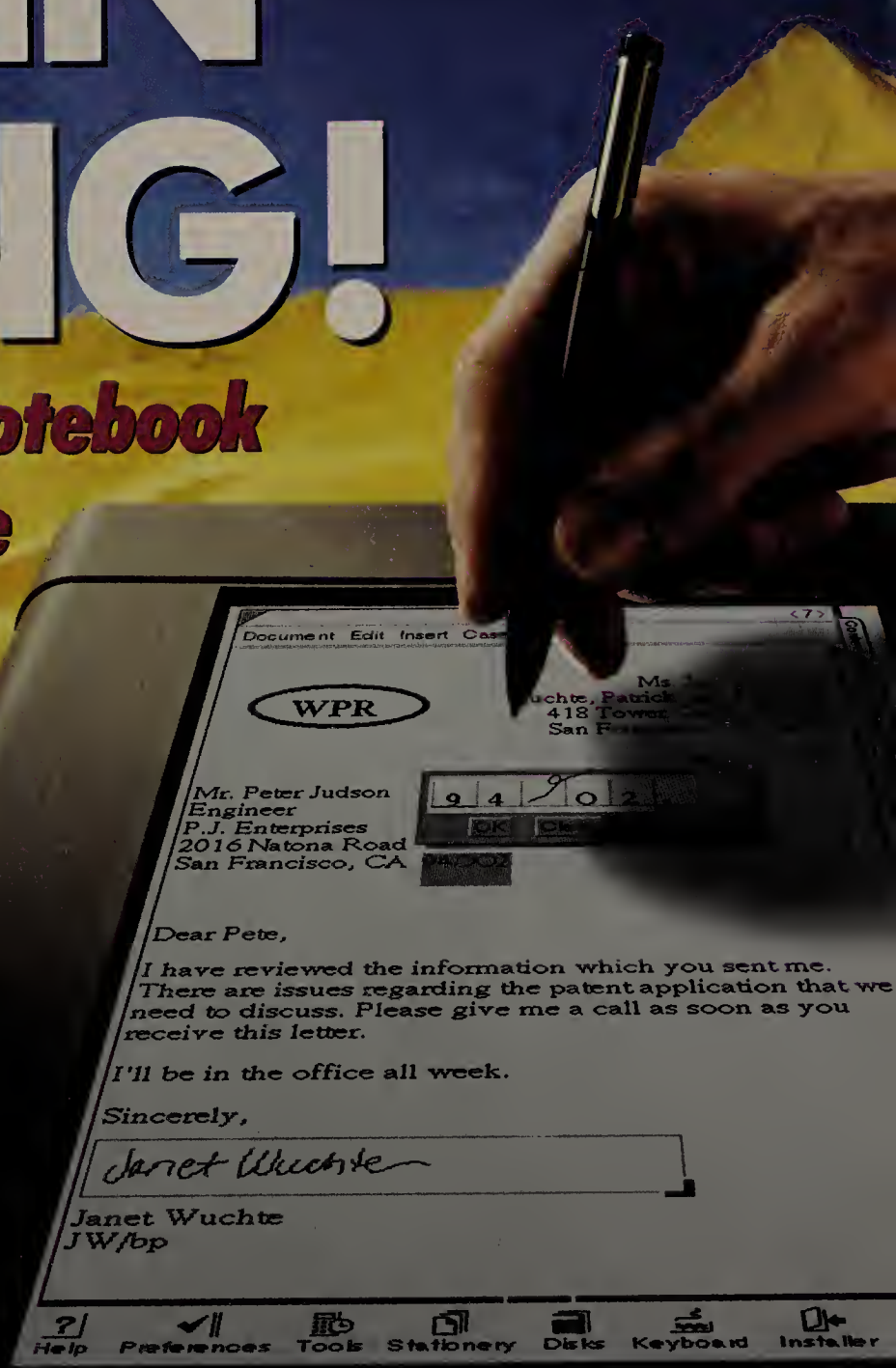

NETWORK SURVIVAL KIT

- Can You Beat NetWare?
- Illustrated Guide to LAN Layouts
- Quiz: Test Your Network IQ

PRACTICAL 486 POWER

Five 33-MHz Monsters for Real-World Applications

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With Windows, the future takes shape.

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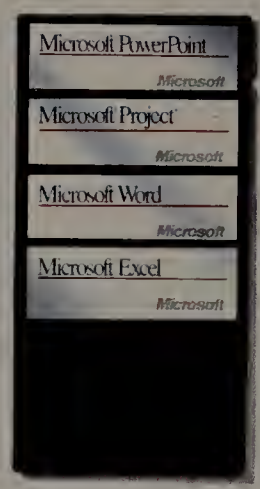
With our Windows applications, it soars.

You already know that the Microsoft® Windows™ environment can enhance the way you work with your PC. And now you can achieve even greater heights. With Microsoft Windows applications.



They're specifically designed to get the most out of the Windows environment. Saving you considerable time. And effort.

Which is exactly what computers are supposed to do anyway. To start with, every Microsoft Windows application shares similar, friendly icons, menus, and dialog boxes. So as soon as you get to know one, you'll be well on your way to knowing them all.

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So go ahead and do a little experimenting. With different type faces. And sizes. And formats. Then try something really gutsy.

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Here's another one. The ability to establish links between our applications. Which means if you change numbers in Excel, the chart you just pasted into your Word document will be automatically updated. This helps keep errors to a minimum, and you free from tedious repetition.

Of course a change for the better is still a change. So we've made sure our applications read common file formats. Everything from Lotus® 1-2-3® to WordPerfect®. That way you can bring the work you're doing along with you. Making the move to Windows applications even smoother.

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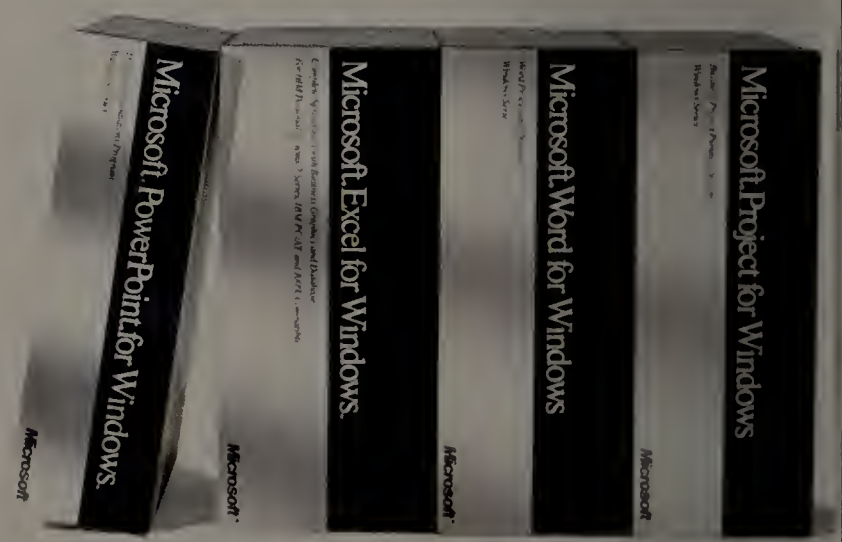

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March 1991
Volume 9, Number 3

PC WORLD

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PenPoint Puts It in Writing First there was the pen; then there was the PC. Now there's PenPoint, an operating system for notebook PCs that understands handwritten input and promises a new generation of intuitive applications/**Richard Landry** 83

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33-MHz 486s: Ultimate PC Power These brawny beasts are speed demons—and they'll empty your wallet in a hurry, too. If you need the muscle, check out our ratings of what's best/**Lincoln Spector** 128

Can You Do Better Than NetWare? As networks expand companywide, NetWare 286 may not cut it anymore. Our tests reveal which of three major contenders beats the old standby/**Robert Lauriston** 157

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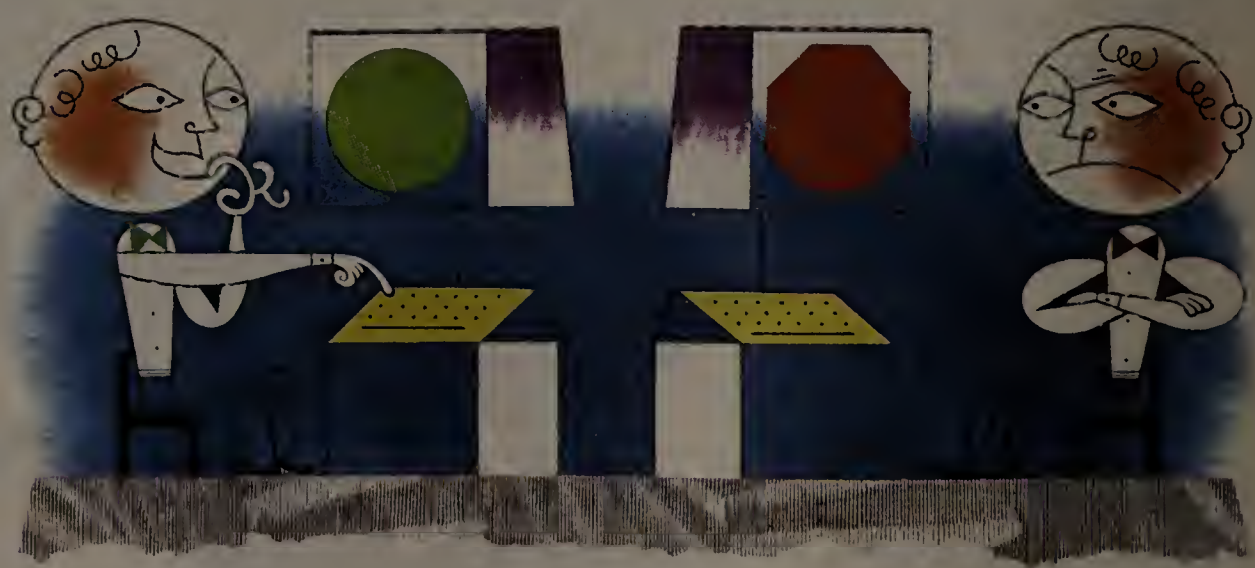

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APPEALING.

Shelling out an extra $10,000 for a Compaq SystemPro with chancey service is appalling. With that kind of iffy support, they should be paying *you* the ten grand.

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There's a lot to know before you buy a server. When you call Dell, our experts will give you the help you need to buy an advanced PC or UNIX server. Then we'll send it off with a 30-day no questions asked money back guarantee, and a one year limited warranty.

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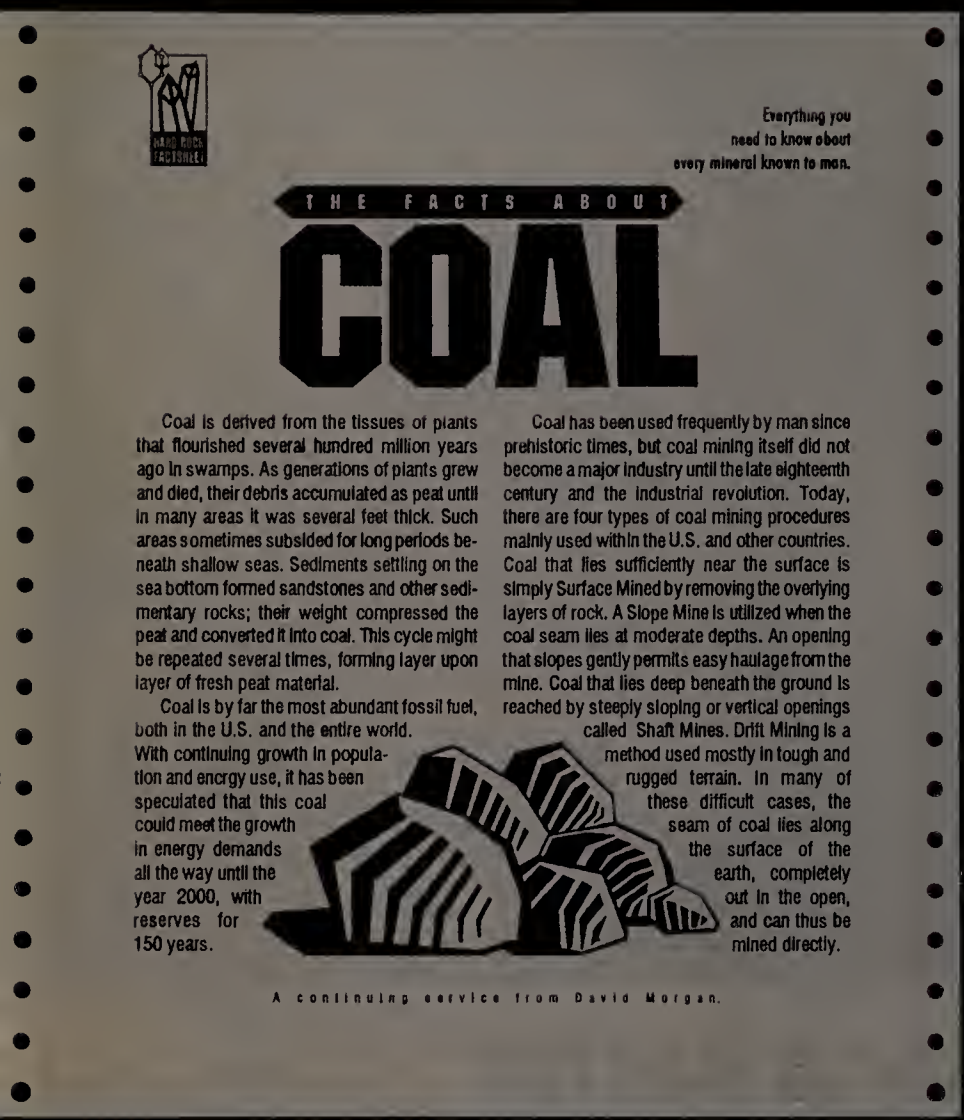

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THE FACTS ABOUT

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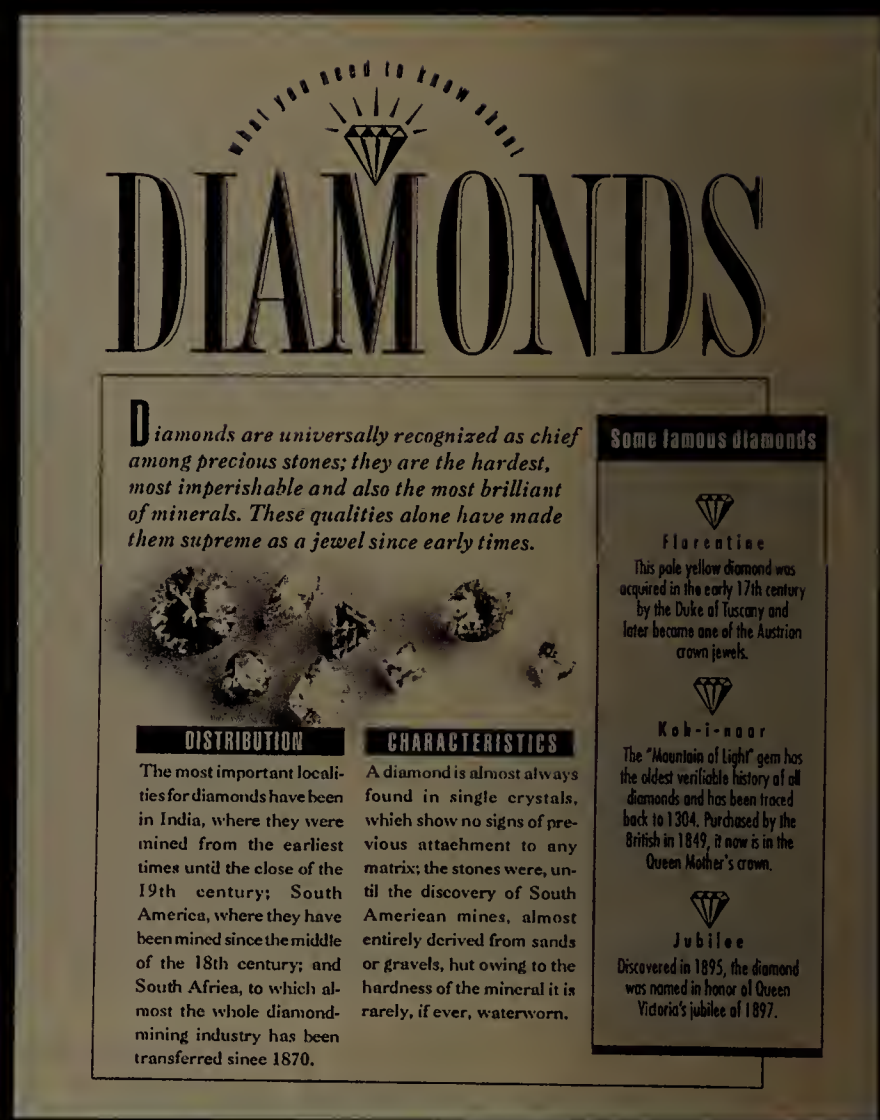

what you need to know about

DIAMONDS

Diamonds are universally recognized as chief among precious stones; they are the hardest, most imperishable and also the most brilliant of minerals. These qualities alone have made them supreme as a jewel since early times.

DISTRIBUTION

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CHARACTERISTICS

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Some famous diamonds

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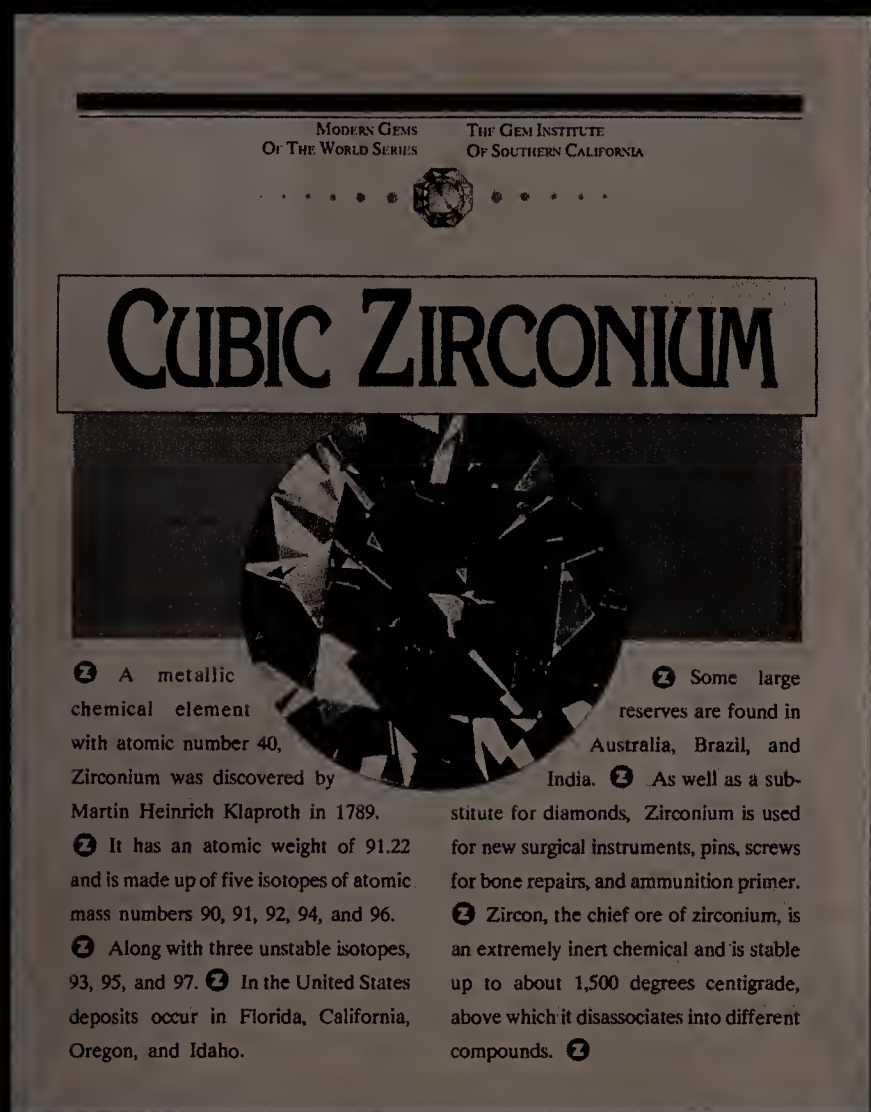

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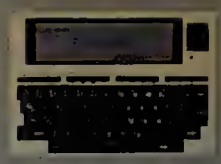

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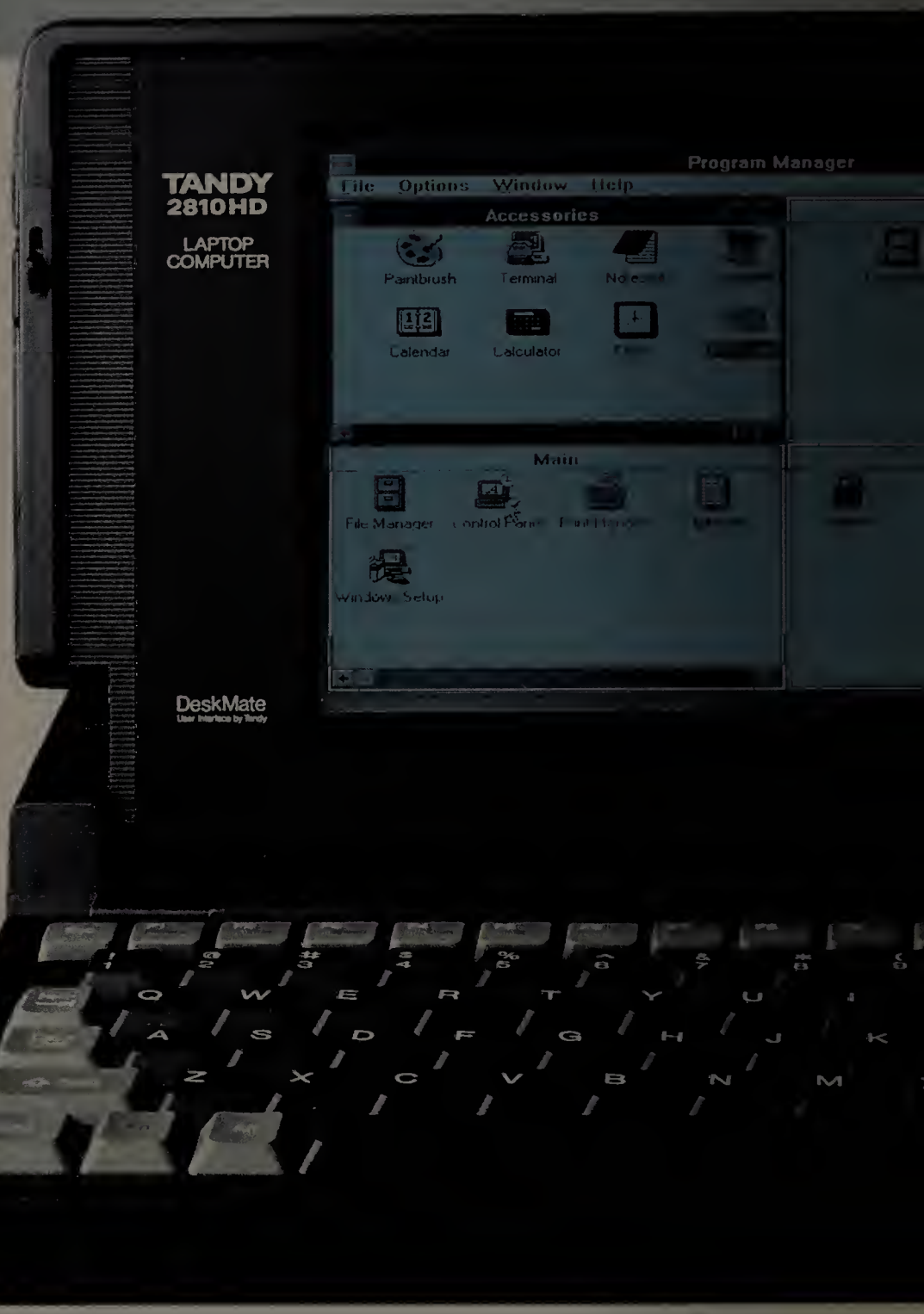

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Circle 284 on reader service card

Robert Carr proves how potent a gesture can be to Editor in Chief Richard Landry.

ROBERT CARDIN

The Power of a Gesture

Your next notebook PC may *really* be a notebook—a smart one, too. Write on the surface of its LCD screen with a special stylus, and it will convert your printing into the font of your choice. Use the stylus to make "gestures"—taps on the screen, proofreader's marks, and other strokes of the pen—and you'll issue commands, edit text, and customize applications.

The hardware will be available late this year at a price comparable to today's SX notebooks, and a full suite of applications should arrive at about the same time. But PenPoint, the operating system that makes it all possible, is up and running on prototype notebooks with functioning applications right now. Working under nondisclosure for over a year, Editor in Chief Richard Landry has been keeping a close eye on PenPoint, the brainchild of developer Robert Carr, vice president of software development for Go Corporation.

PenPoint promises to foster new intimacy between user and PC. "Normal computing is too abstract," says Landry. "We all learn to compensate for it one way or another. But we forget that something was lost—the immediacy of the information."

Putting a pen in your hand isn't the only way that PenPoint will make computing more concrete. Carr claims that PenPoint's "document model" is much more intuitive than the usual ritual of starting a program and loading a file. "With PenPoint, everything is always live and running," says Carr. "This is truly an object-oriented environment." PenPoint documents will let you build in functions similar to those of today's spreadsheets, graphics programs, and data managers. Moreover, user-definable "go to" buttons will shunt you to precise locations in other documents.

According to Carr, several leading software companies already have PenPoint applications under development, and a host of others are looking closely at the new environment. Why the intense interest in a new operating system? One reason is that PenPoint is chock-full of "services" that any application can draw upon: fonts, gesture recognition, installation routines, search and replace, spell checking, and all the tools required to create an interface.

In the early eighties, Carr made his mark as the primary developer of the leading integrated package, *Framework*, which he says "gave me the background necessary to create a service-based operating system like PenPoint." The building-block architecture makes programs easy to write and ensures that PenPoint applications will operate in a consistent manner.

Still other services support mobile computing. A PenPoint notebook will "plug 'n' play" into most LANs, and the operating system has what Carr calls a "promiscuous" file system that ensures smooth conversion among all major DOS, UNIX, and OS/2 file formats.

The pen won't replace the keyboard any time soon, especially when it comes to entering data. But as Carr says, "the pen is the world's best editing and linking device." Carr feels that the timing is perfect for a notebook computer that's pen-based and personal, whose value grows as you link and customize your data. Soon, you'll be able to take pen in hand and see for yourself.

Eric Knorr
Editor

The perfect en
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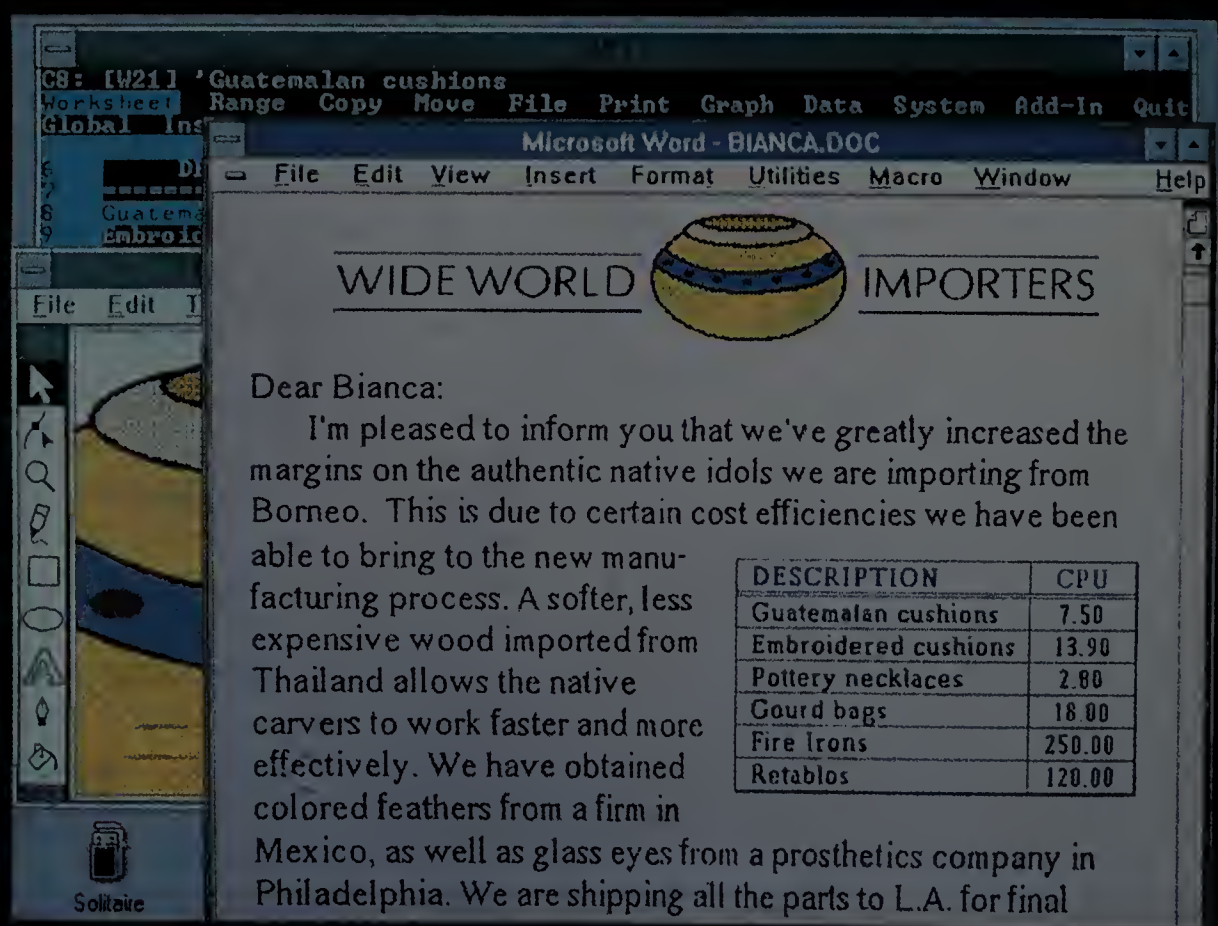

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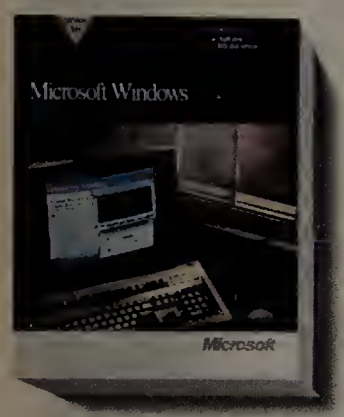

The Microsoft® Windows™ graphical environment version 3.0 makes it easy for you to do a lot more with your PC. That's because the Windows environment has friendly icons, menus and dialog boxes that make its powerful features very accessible.

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LANtastic's™ tiny RAM now has more cards to play with.

If the presence of Micro Channel machines has ever stood between you and the joy of running the award-winning LANtastic PC Network, this is your lucky day. Artisoft has just added three new Micro Channel adapters to its compliment of AE-2 Ethernet, 2Mbps and Voice adapters.

PC MAGAZINE EDITORS' CHOICE March 28, 1989 LANtastic

LANtastic AE-2 MC Ethernet for Micro Channel, a 16-bit adapter that can be used in either a 16-bit or a 32-bit slot, is in 100% compliance with IEEE 802.3 and Ethernet standards, and comes with on-board 16K RAM that is user expandable to 64K. Since AE-2 MC Ethernet is software compatible with Novell's NE/2000 hardware, you can run Novell "out of the box."

PC MAGAZINE EDITORS' CHOICE May 29 1990

LANtastic 2Mbps MC adapters are the perfect way to economically network small or midsize businesses with Micro Channel computers. Each card includes a 10Mhz coprocessor and 32K of on-board dual-ported RAM, along with software-selectable IRQ and RAMBASE address settings. Artisoft's version of the NetBIOS standard can be loaded into and executed within the adapter. This plunges the NetBIOS draw on a PC's base RAM down to just 2K and off loads the network processing onto the adapter. The cards are easy to install and use inexpensive dual-twisted pair cable.

LANtastic Voice MC adapters let you save sound and speech onto disk for playback later on Micro Channel machines. Use them with LANtastic NOS 3.0 or above, and you can send voice messages across your LANtastic network. Just pick up the telephone handset provided with each Voice Adapter, bring up a handy on-screen menu, and talk. Use Voice Chat to carry on a real time conversation, or save the message for playback later in your own voice – either through the handset or through the Micro Channel machine's internal speaker.

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Circle 18 on reader service card

GO UNVEILS PENPOINT

Other Companies Pledge Support, but Microsoft Counters With Its Own Pen Environment

Go Corporation has released PenPoint, the first operating system designed exclusively for pen-based computers, amid pledges of support from computer makers and software market leaders. Borland, WordPerfect, and Lotus promise PenPoint applications, as do software start-ups like PenSoft and Slate.

But users won't see the operating system or applications before fall, when the first pen-based notebooks begin to trickle out from independent hardware suppliers. Grid and NCR hope to beat Go investor IBM to market but are hedging their bets with Microsoft's *Pen Windows* alternative. Both plan $4000-to-$6000 386SX computers capable of running either operating system. "[Microsoft and Go] are going to be fighting for the same turf," explains Grid marketing director Kenneth Dulaney, who plans to let customers choose.

The Grid and NCR notebooks both measure roughly 9 by 12 by 1 inches, weigh approximately 5 pounds, and come with 3MB to 4MB of memory. Grid will offer a hard disk option, but NCR will use only flash RAM and SRAM for storage. Grid already has a DOS-based stylus computer, and it plans one capable of running true pen applications in early 1992. NCR's target is the third quarter, and IBM won't say.

Microsoft is waging what one hardware representative describes as a "disinformation campaign" emphasizing PenPoint's lack of compatibility with desktop DOS applications. A developers' conference is scheduled for February, and a year-end release is planned for *Pen Windows*.

Kyocera, Wang, and Momenta have pledged support for *Pen Windows* but not PenPoint. Significantly, IBM, an early Go supporter, has not announced for *Pen Windows*.

3COM BOWS OUT

Passes LAN Manager Enhancements and Its 3+Open Network Sales to Microsoft

3Com's plan to give up its network operating system (NOS) business in order to concentrate on selling network servers and bridge hardware could, ironically, result in a better solution for *LAN Manager* customers. A *LAN Man* codeveloper whose *3+Open* version was first to market, 3Com has set aside $9 million for continued support of that and earlier NOS products. *3+Open* (*LAN Man*) will continue to be supported on 3Server, reports Director of Marketing Jeff Thermond, and 3Com will license the key Macintosh/NetWare connectivity and directory services in *3+Open* to Microsoft for inclusion later this year in *LAN Manager 2.0*. 3Com claims to have garnered 60 percent of the *LAN Man* business, compared with 23 percent for next closest competitor IBM. That aside, vendors and users alike have suffered from a proliferation of incompatible versions, maintains Jamie Lewis, executive vice president of the *Clarke-Burton Report*. "The *LAN Man* market was so confused that a lot of people just bought Novell by default."

Microsoft will take the retail sales baton from 3Com and double its *LAN Manager* dealer force to 600 by the end of the year, which should simplify user choices. "The options haven't changed, but *LAN Manager* will very quickly become more solid now that Microsoft owns the code," predicts Lewis. "Now you know who's in charge of the technology, and you know where to look for aftermarket products."

3Com will focus on supporting and moving its 1 million or so NOS customers over to Microsoft's *LAN Man*, hoping to sell 3Servers in the process. Microsoft could grow that base of *3+Open* customers into a 15 to 20 percent share of LAN users by 1993, estimates Lewis. But in order to do much better, Microsoft has to short-circuit Novell, which is expected to double the number of NetWare users to about 16 million by then.

GORDON STUDER

PFS LINE SOLD

Spinnaker Takes Over as SPC Focuses on Corporate Buyers

Software Publishing Corporation (SPC) of Mountain View, California, a pioneer in the sale of inexpensive, easy to use software through dealers, is breaking with its retail roots by selling its low-end PFS line to Spinnaker Software of Cambridge, Massachusetts.

In return for 16 percent of its stock and future royalties, Spinnaker gets the very popular *PFS:First Choice* and *PFS:First Publisher*, as well as *First Publisher* accessories, *PFS:Preface*, and *PFS:Easy Start*. SPC will support PFS products for the next "several months" until the transition is complete.

Software Industry Bulletin publisher Jeff Silverstein explains the sale as being part of a long-term SPC strategy "to position themselves as a major player alongside Lotus and Microsoft [among providers of] corporate networked applications." *Harvard Graphics*, a corporate favorite, already represents roughly 70 percent of all SPC revenue, suggesting the need for a strategic refocus. "If you want to play to win, you have to concentrate your forces," emphasizes SPC CEO Fred Gibbons.

Last September the firm introduced *InfoAlliance*, an OS/2-based information access product and the centerpiece of a strategy to gain a more mission-critical role in large firms. Most corporations have been slow to move to such client-server applications, but Gibbons already has landed a few key contracts with large firms.

BEYONDMAIL ANNOUNCED

New Front End Promises Innovative E-Mail Filters and Ways to Launch Apps

A Cambridge, Massachusetts, start-up has announced a new E-mail front end with innovative ways to filter and route messages, even launching applications upon their receipt. *BeyondMail*, scheduled for release by Beyond Inc. by mid-year, lets the user preassign routing priorities to both incoming and outgoing mail by author, subject, keyword, and a variety of other parameters, such as Boolean "IF...THEN...ELSE" logic. That could be a sanity saver if the number of LAN-based E-mail boxes (3.5 million today) continues to grow 35 to 50 percent a year, says Beyond president Chuck Digate, formerly responsible for spreadsheet development at Lotus.

The program also has the ability to recognize the file format of a non-ASCII attachment to a message and launch the application used to create that attachment. Taking advantage of the macro capabilities vested in most applications, *BeyondMail* can automatically initiate routine tasks such as the consolidation of sales expense reports into a budget spreadsheet upon their receipt or at any predetermined time and date, and without the involvement of the recipient.

Jeffrey Tarter, publisher of *Soft-letter*, calls *BeyondMail* a new class of E-mail software, adding, "I don't know if I can describe it without gushing. It's the next best thing to having a secretary managing your E-mail, maybe even a little better because it never forgets."

The user sets up rule-based forms that work on any of the wide array of E-mail systems such as *cc:Mail* and *Network Courier* that use Action Technologies' Message Handling Service (MHS). A single-user version of *BeyondMail* will sell for $250 and come with several prepackaged and user-definable forms for common uses. Beyond plans a similar *1-2-3* add-in, *@Mail*, for about half that price this spring.

PROCOMM PLUS 2.0 SHIPS

Can This David of Comm Software Stay on Top After Only Wounding Goliath?

Datastorm Technologies' latest version of its best-selling communications software features a powerful scripting language, a raft of terminal emulations, and some helpful new features, such as a clipboard for cutting file names from a BBS and pasting them into a DOWNLOAD FILE command.

In three years, Datastorm has garnered 500,000 licensees for *Procomm Plus*, the retail version of its *Procomm* shareware product, which itself has 250,000 licensees and possibly ten times as many users. It got there by offering what it calls "intuitive communications" after big companies like DCA and Hayes pioneered the category with capable but rather technical offerings. The little shareware company that could now enjoys the lead among comm software marketers, but version 2.0 of its $119 package comes two and a half years after version 1.1B.

Datastorm's competitors spent that time developing "stripped-down" but more competitive versions of their flagship packages. DCA's new $99 *Crosstalk Communicator* and Hayes's similarly priced *Smartcom Exec* are both designed to appeal to so-called executive users who need fewer features and want simpler commands. With *Windows 3.0* a hot ticket, Datastorm may in addition have to contend with DCA's *Crosstalk for Windows* and *DynaComm* by Future Soft.

The company plans a *Windows* version of *Procomm Plus*—eventually, says cofounder Stephen Monaco, but it doesn't feel pressured to enter a technology race. Monaco is especially nonplussed about the threat from DCA's and Hayes's *Procomm Plus* clones. "If you can buy either a Volkswagen or a Mercedes for the same price, most people will go with the Mercedes," asserts Monaco.

SPREADSHEET VENDORS DEAL

Sales War Depresses Prices, Brings More Software Extras and Upgrade Choices to Users

Microsoft's January introduction of *Excel* version 3.0 has launched a new round of spreadsheet skirmishing, bringing users lower street prices, cheaper upgrades, and high-value software bundles. Spreadsheet head Richard Tong figures that the $10 million Microsoft lavished on its *Windows 3.0* rollout, together with a lesser amount for *Excel 3.0*, will work to drive a wedge between Lotus and its most prized corporate customers.

Windows is important, but only 20 percent of corporate users are equipped to run it, counters Paul McNulty, Lotus director of DOS spreadsheets. He hopes to "freeze" even those customers until this summer's release of *1-2-3* for *Windows* by offering buyers of the graphical release 3.1 a $49 upgrade to any *1-2-3* version. And anyone buying the $595 program before April 30 gets a $20 copy of the $495 *Ami Professional*, the highly acclaimed *Windows* word processor from Samna.

Market share is hotly debated, but International Data Corporation (IDC) figures that Lotus's unit share slipped about 5 points last year to a still-healthy 57.7 percent. Meanwhile, Borland doubled its share to 23.6 percent—a development that IDC senior analyst Mary Conti Loffredo attributes to its clever direct-mail offer of *Quattro Pro 2.0* to *1-2-3* users for $100. Even users paying "full price" for *Quattro Pro* get $300 worth of coupons for graphics add-ons. Lotus countered by reorganizing its dealer sales force and giving in-store upgrades for around $110.

Microsoft resisted price-cutting last year, and *Excel*'s share rose only 1 point to 9.6 percent. But Tong says that Microsoft is intent on doubling its share this year. "Microsoft has been willing to buy market share in every market they have been in," says *Soft-letter* publisher Jeffrey Tarter, who adds that Microsoft is running particularly hard after corporate buyers. Even single-copy buyers can get a $99 copy of *Excel 3.0* through one of 200 to 300 free *Windows* training seminars being held across the country this year.

GORDON STUDER

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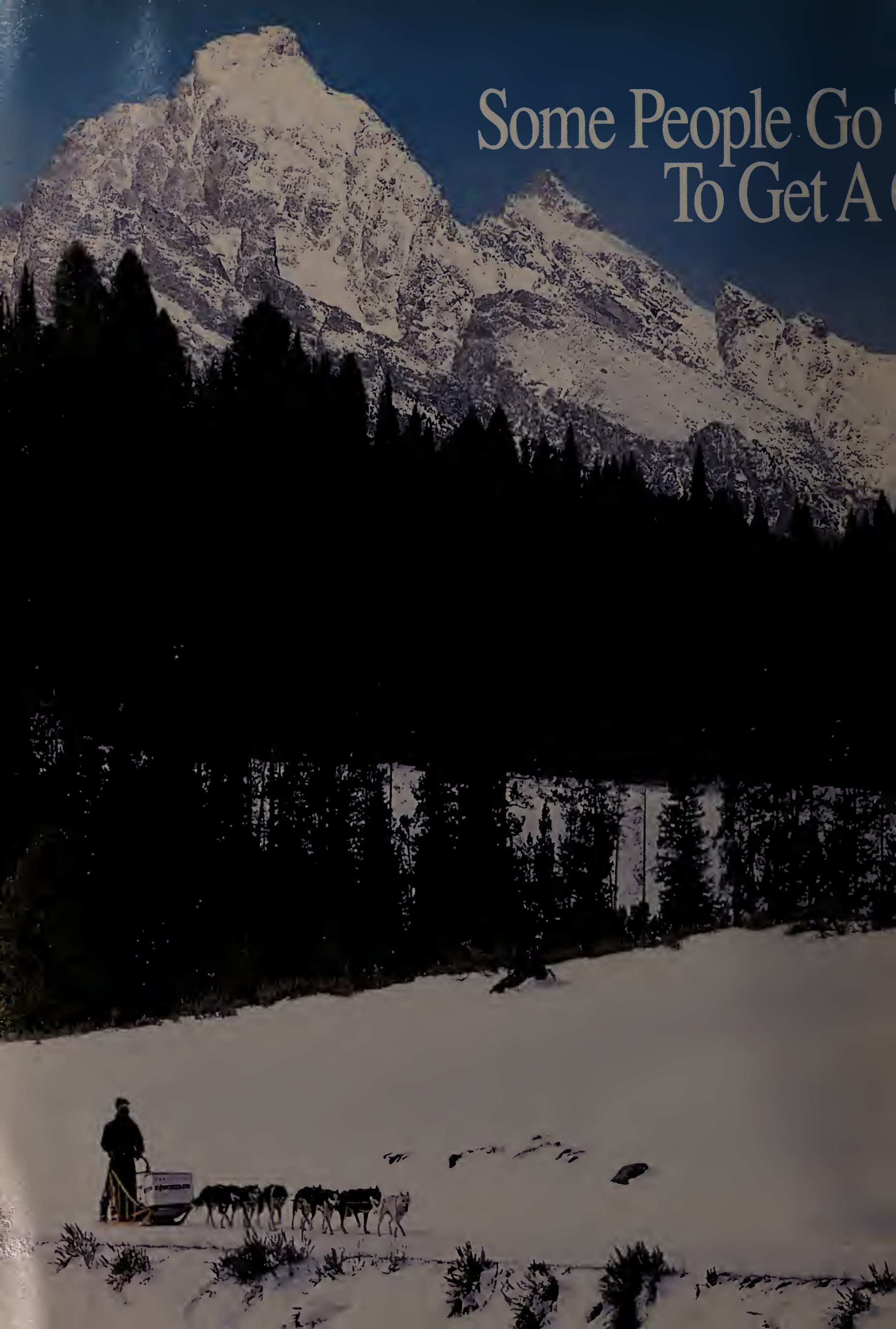
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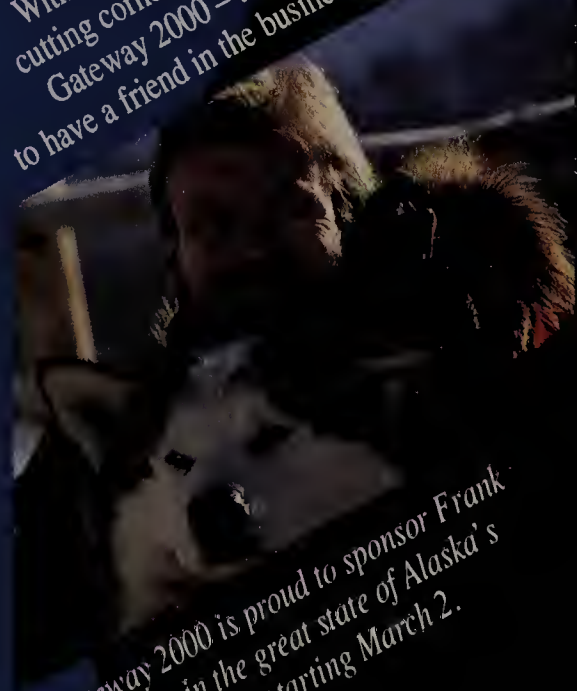

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Standards: The Good, the Bad, and the Ugly

Are standards really such a good thing for PC users?

Henry Ford understood the benefits and limitations of standards better than most people. The first Model T's rolled off his assembly line cheaply, quickly, and in any color you wanted—as long as it was black. Later, competition forced him to offer other models (and other colors), but long before that happened, Ford had succeeded in making the automobile a staple of American life.

If you wanted to write a quick-and-dirty history of the PC industry, you could simply rework Ford's story, substituting a few names, dates, and places. Your conclusions would be just about the same, though: Standards helped the PC evolve overnight from a technical oddity to a pervasive business force. But today, the old standards hobble the PC's potential in ways that cry out for alternatives. For the standard bearers, the challenge is to remain nimble enough to do more than simply survive.

Standards: For Vendors or Users?

Ford's story underscores another fact of life in the PC world: Standards serve vendors just as much as they serve users. Unfortunately, it's sometimes difficult to see where user benefits end and vendor interests take over.

Witness two monumental standards battles taking place in the pages of *PC World* this month. On one hand, upstart Go Corporation makes a daring grab at leadership in the emerging area of pen-based notebook PCs (see "PenPoint Puts It in Writing" in this issue). On the other hand, network giant Novell fends off intense competition from aggressive rivals with a new and improved version of its aging NetWare operating system (see "Can You Do Better Than NetWare?").

Ironically, the upstart Go and the venerable Novell face the same foe—Microsoft—and the same question—will their products serve users well as standards in the long run? But the irony doesn't stop there.

Microsoft pans Go's PenPoint operating system as an unnecessary distraction for developers and users who could otherwise take advantage of pen enhancements to *Windows*. With simple modifications to their existing *Windows* software, developers will be able to support the new pen-based notebook PCs that promise to redefine portable computing in 1991. And by running *Windows* programs both at the desktop and in their pen-based notebooks, users will be able to maintain all the advantages in training and compatibility that come with sticking to a single established standard.

Meanwhile in the networking arena, where Novell reigns supreme, Microsoft sings a somewhat different tune. NetWare was built mainly for file and printer sharing—important tasks for a LAN, but more representative of networking's past than its future. Microsoft's *LAN Manager*, by contrast, was designed from the ground up for a new generation of client/server computing. Its rich resources will permit developers to create whole new classes of network-based applications (like Microsoft's own *SQL Server*), giving users more substantial benefits than they get from the cables and boards that loosely tie their organizations together now.

Even without dwelling on the apparent contradictions in these arguments, Microsoft's rivals have plenty of ammunition at their disposal. Go claims that *Windows* is both too unwieldy and too anemic to tap the power of the new notebook computing metaphor; a next-generation computer requires a next-generation operating system, not a Macintosh knockoff. And Novell can say that the first job of a network operating system is simply to work well. With years of networking experience under its belt, Novell is delivering a more solid product today, and it promises the enhancements users will need tomorrow.

Yet it's tough to argue with the notion that software should be compatible across all the computing environments you might use, or that networks can deliver more than they do right now. It's really just a question of how to get from here to there.

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Circle 153 on reader service card

Wanted: Great Software Standards

Standards are a good thing for users—unless of course, the standards themselves are no good. While it seemed for a while that *Windows* and 386 chips were forging a golden age of PC standards, in truth, hardware and software developers have been working overtime to create revolutionary, exciting, and sometimes incompatible innovations. Nineteen ninety-one is going to witness the birth of enormous numbers of these prodigies. They might wither on the vine because they're not compatible with what came before them. Then again, they might spark a whole new round of creativity among the standard bearers. Who's to say—except you?

As always, I'm interested in your opinions on this or any other subject. Write to me at *PC World*, 501 Second St. #600, San Francisco, CA 94107; fax 415/442-1891; MCI Mail Richard Landry/301-3685.

POWER TIP NO. 169

Printing Multiple Copies Quickly

If you use a program's commands to print multiple copies of a document, your system will be tied up until the program has finished printing all the copies. But if you have a printer with a sufficiently large buffer, you can avoid some waiting. Make the multiple-copy selection on the printer instead of with your program, and then send a single-copy instruction to the printer using your application. You can get back to work while the printer generates multiple copies.

Jack M. Crowther
Hilo, Hawaii

ANY PC
ANY TIME
ANY PLACE

Introducing Geo

The Incredibly Easy Way To Do More With *Any* PC In The Office Or At Home.

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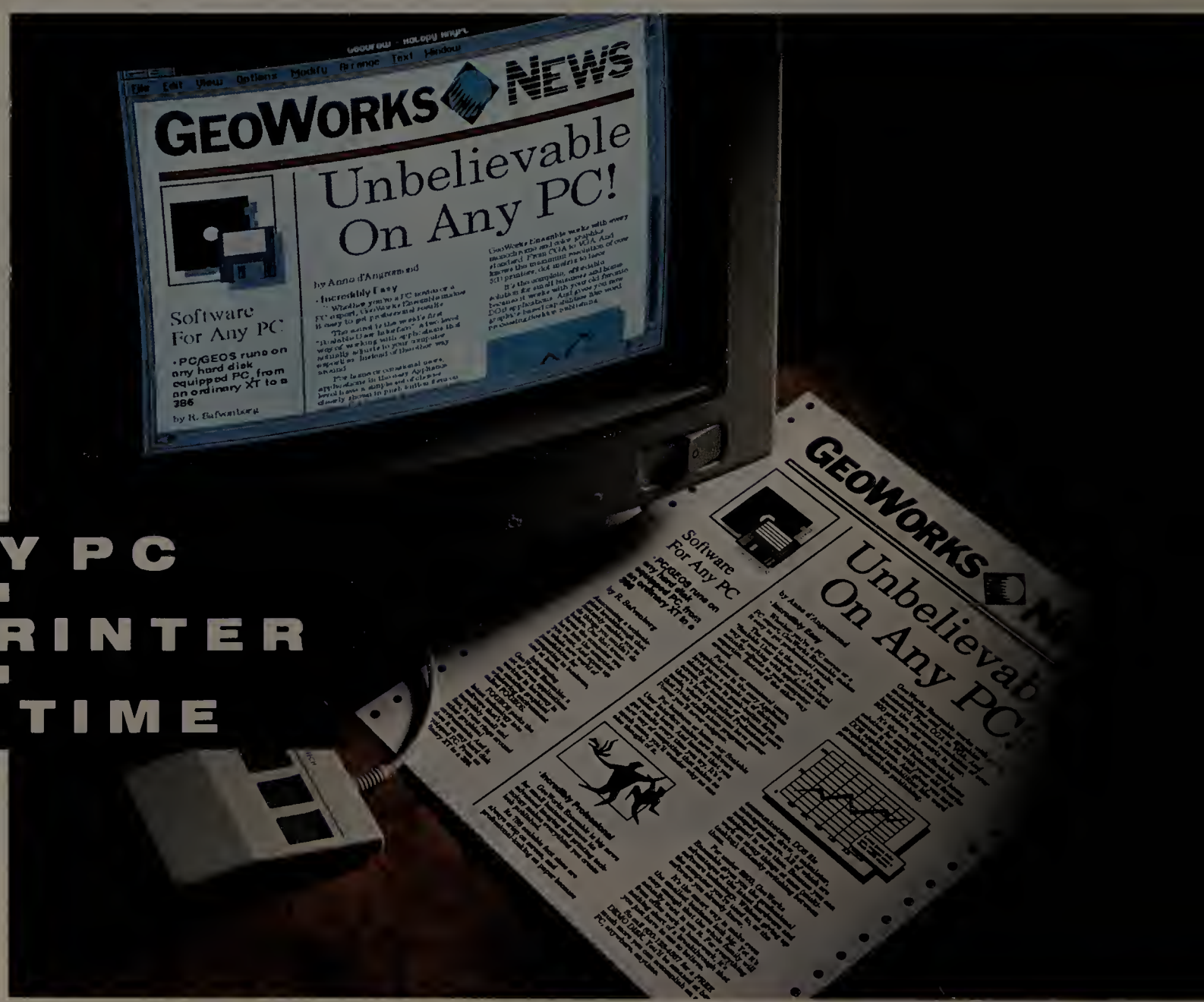
PC/GEOS packs the latest technology into software that's so incredibly small and fast, it runs rings around other graphical environments. And it does it on any hard disk equipped PC. From an ordinary XT to a 386.



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ANY PRINTER
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Works Ensemble:™

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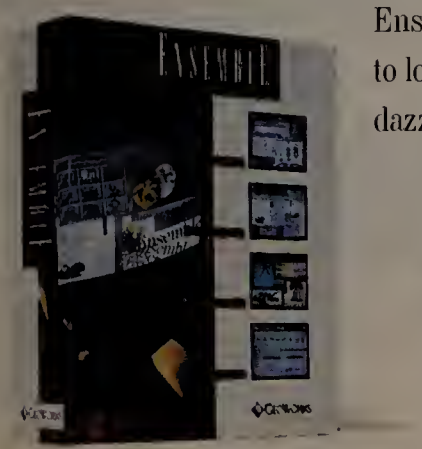

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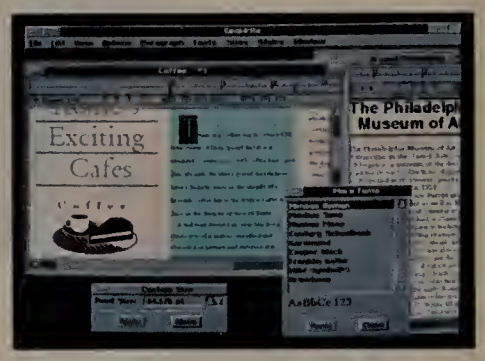
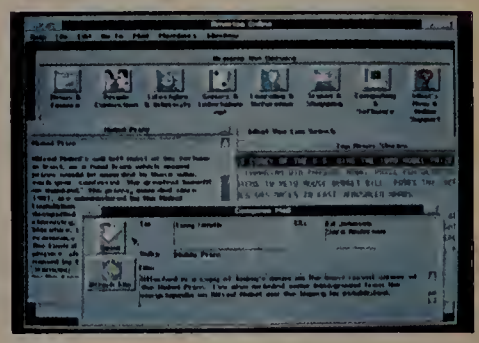


WORD PROCESSOR

GRAPHICS



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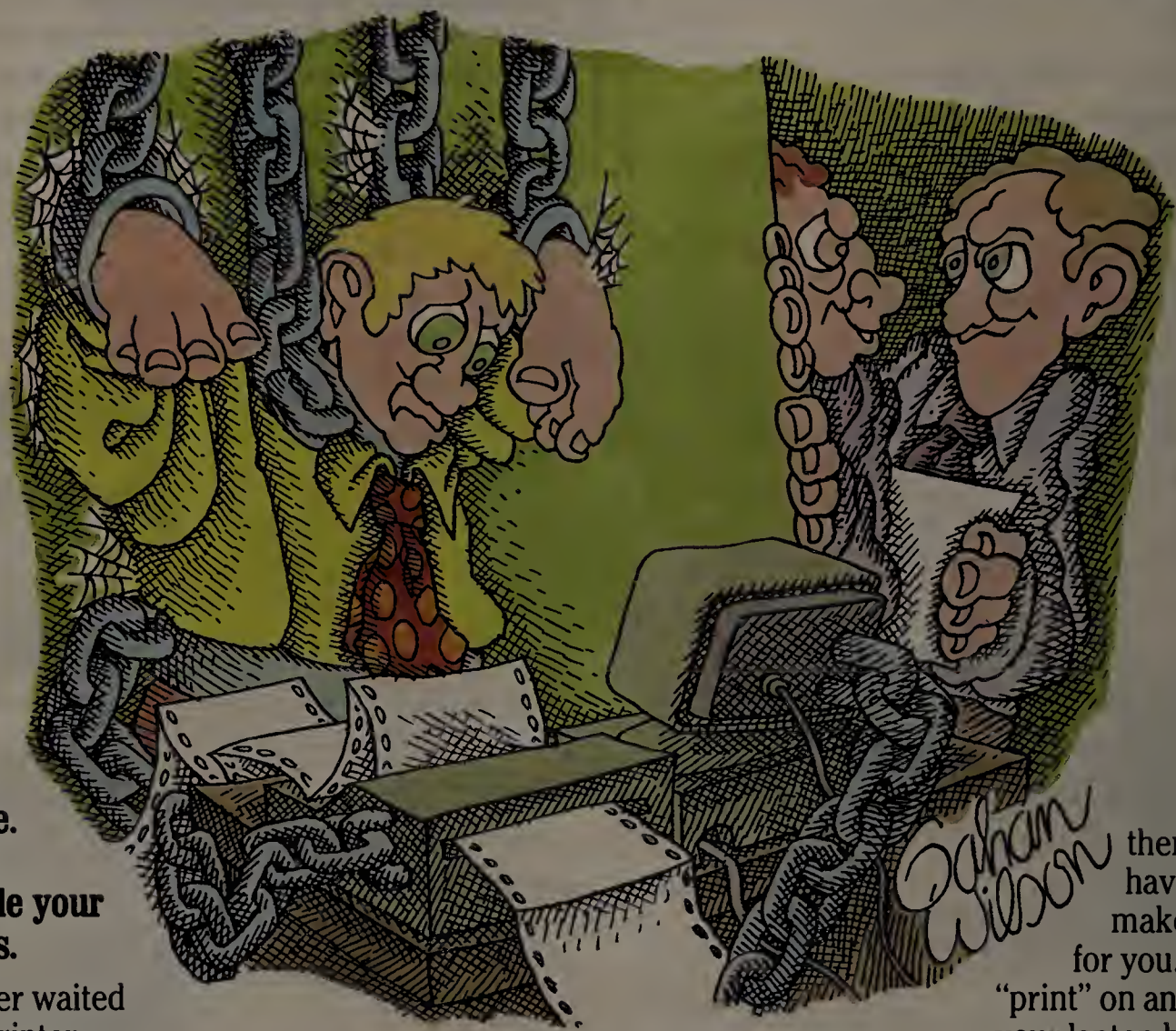
Circle 92 on reader service card

Still hanging around, waiting for your spreadsheets to print?



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If you've ever waited idly for your printer to finish a spreadsheet, then here's a product that's been worth hanging around for.

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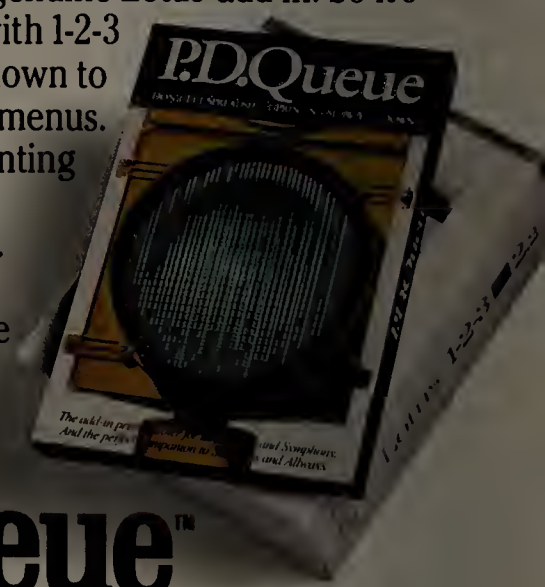

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Circle 60 on reader service card

LETTERS

Reactions and responses from the PC World community

TIM CARROLL

An Open World

Richard Landry brought out an interesting point in his December column ["How to Avoid the PC Slump of 1991"]. While companies drag each other into court to gain economic advantage, they may actually be decreasing their profits. Intel has done very well because of the proliferation of PC technology, and the cross-licensing agreement allowing AMD to produce a 286 processor helped expand the PC market. It's clear that legal duels like the one between Intel and AMD hurt the consumer. When will the litigants realize they're hurting themselves as well?

Robert E. Stevens
Savannah, Georgia

ANTHONY RUSSO

A Universal Macro Language?

After reading Richard Landry's comments in December, I agree that BASIC is likely to become the "standard" macro language for *Windows*, but there's a better choice: REXX, which is an easy-to-use, more powerful procedures/macro language. It is IBM's SAA Procedures Language and is included in OS/2 1.3. This cross-platform language has implementations for DOS, UNIX, and the Amiga operating system. The American National Standards Institute has formed a committee to develop a REXX standard, and REXX is a strong candidate to become a universal macro language.

Cathie Dager
Palo Alto, California

Finding Extend-A-Name

In his November column, Richard Landry made observations about *Extend-A-Name Plus* but didn't say where to find it. I did some consulting for the developer several years ago and have used this software for years. It was exactly what I needed to find my way through the morass of gibberish I called file names. Because *Extend-A-Name Plus* gives me 60 characters, I can make names perfectly clear. Now I can use my brain for more important things. This program is a gem! For more information contact World Software Corp., 124 Prospect St., Ridgewood, NJ 07450; 800/962-6360, 201/444-3228.

Allen Hart
Fort Lee, New Jersey

Buying Smart

I'm new to *PC World*, and I like what I see. Your December evaluations of 25-MHz 386s, SX laptops, and PostScript printers were well done, but if I had to select one element as the most useful, it would be the "Buying Smart" sections. You pick out the basic, important issues and give them a lucid explanation. The way you present information really separates *PC World* from the pack.

Helene Ross
Chicago, Illinois

Reactions to a Scented Ad

Whew! What a smell! I appreciate your excellent magazine with its articles, news, and technical and test reports, and I usually can't wait to read it. But because of the scented Acer ad, I had to leave my November issue in the garage for a day to air out...

Axel Kurth
Dover-Foxcroft, Maine

Come on! If I want perfume in an ad I'll read *Cosmo*. Think of all the men who will have to explain that rosy scent to their wives. Next time use Old Spice after-shave. It will have less impact on one's marriage.

Joe Guyette
De Pere, Wisconsin

Thanks for giving me a sinus attack with the scented ad. It caused me a lot of agony, sneezing, and watery and swelling eyes.

James B. Stoney
Whitestone, New York

Opinions of the Budget Conscious

"Budget-Wise Accounting" in November was a well-written comparison of accounting programs. Best Buy *Pacioli 2000 1.02* is a low-priced good deal. But I think that low-priced software should cost less than $250 and that the $795 price of Best Buy *BusinessWorks 7.0* is

(continues)

ridiculous. It's sad that you missed the easiest, most practical low-cost accounting software, *Quicken 4.0.*

Gary Webster
Woodstock, Georgia

Quicken *is an excellent personal finance package. But for small-business use—the focus of our comparison—an accounting package should be a double-entry system. You need that kind of control over your books if more than one person is using the system. —Ed.*

I've been selling and installing Cougar Mountain's accounting software for over two years, and I think you gave *Act 1 Plus* a bum rap. The account-lookup listing is very easy to use, and the easy conversion from single-user to multiuser files shows *Act 1*'s ability to help growing companies expand. As for the criticism of the program's design and its use of nonstandard key assignments, you can assign functions to any key you choose.

Mary Haman
Camarillo, California

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Circle 1 on reader service card

Extra Pages Built-In

Bob Ward's November *User Group Tips* suggestion called for putting a twist in continuous-loop printer ribbons to get extra pages out of them. That isn't necessary with many manufacturers' ribbon cartridges. At Fujitsu, we build a device into our cassette that turns the ribbon over as it passes through. If you were to turn our ribbon over, the benefit would be canceled. But if you're certain that a ribbon doesn't employ a looping device, Mr. Ward's suggestion would be one way to extend ribbon life.

Robert Hall
Printer Applications Engineer
Fujitsu America
San Jose, California

Relatively Relational

After reading the profile of *FormBase 1.1* in November's Windows Special Report, I'd like to correct the misperception of *FormBase* as "nonrelational." Last March [in "New Dimensions for Flat Files"], you called *FormBase* a "highly relational *Windows*-based DBMS." *FormBase* has powerful relational features, such as multiple views of a single data base and the ability to use one-to-many links between data bases via lookups and categorical joins.

Lydia A. Chaverin
Director of Product Marketing, FormBase
Ventura Software
San Diego, California

FormBase *has many relational capabilities. We should have said "not fully relational" instead of "nonrelational,"*

(continues)

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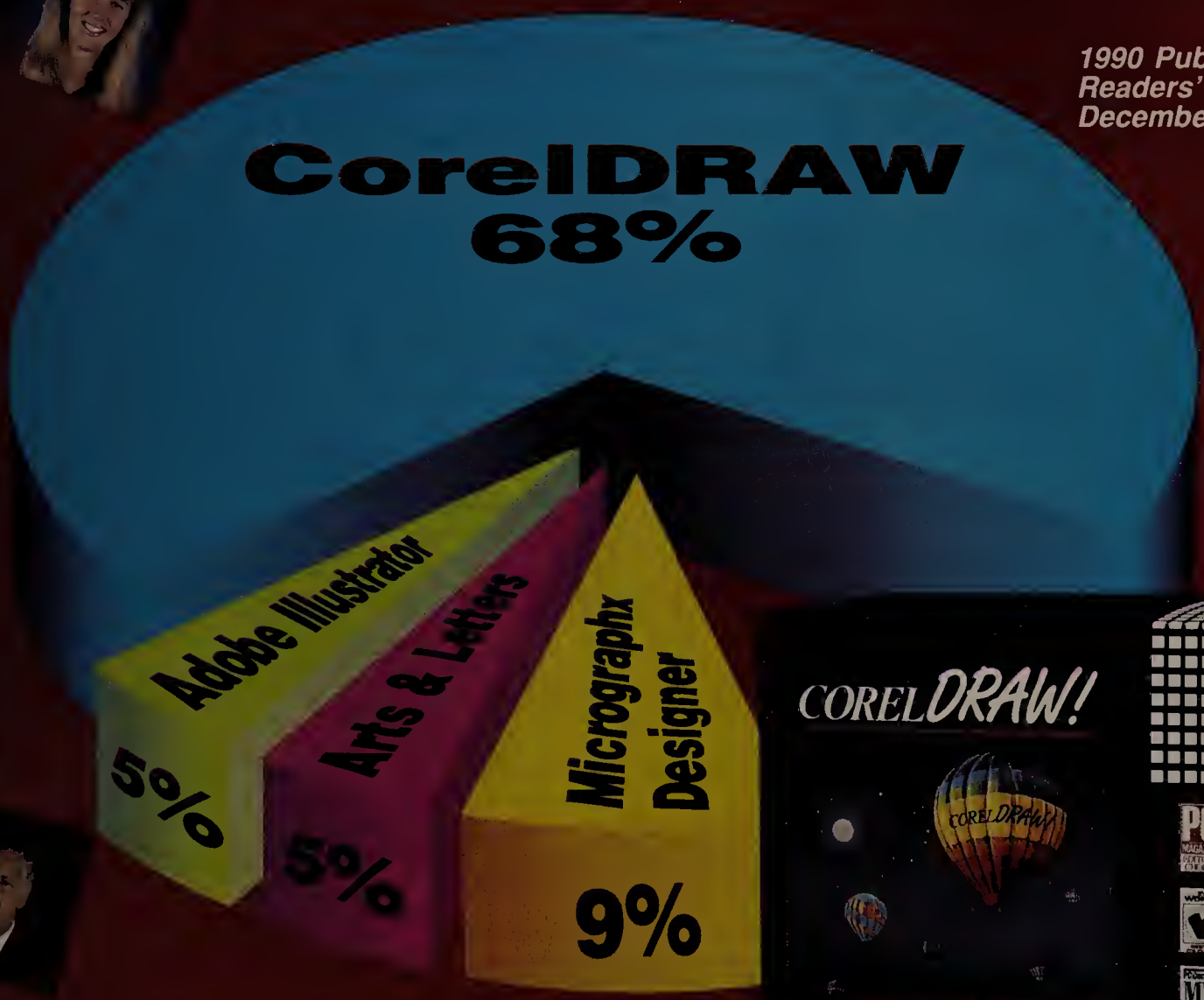
December, 1990



From a cast of thousands of products, the 1990 Readers' Choice Awards acknowledged CorelDRAW as ***the*** most popular PC program in any category. And, for the second year in a row, CorelDRAW won first place as the favorite product in the Draw category with a landslide victory – adding yet another award to this highly acclaimed program.

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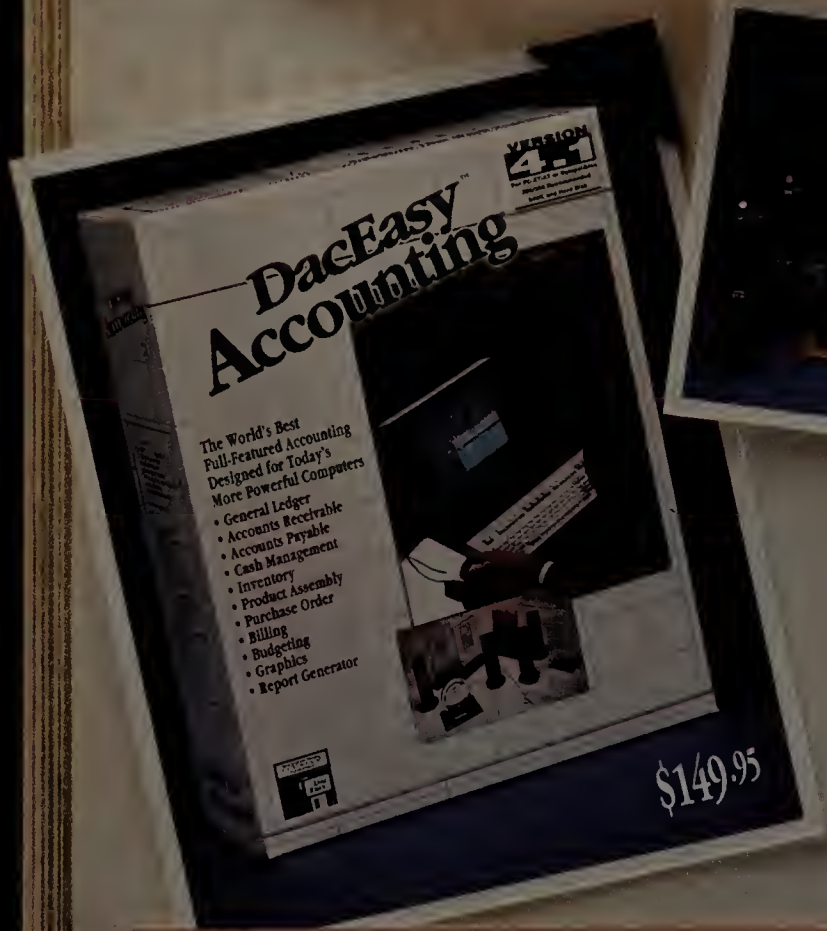

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"For versatility and ease of use, DacEasy is hard to pass up."

-Price Waterhouse Report on Low-Cost Accounting Software
PC Magazine, April 10, 1990

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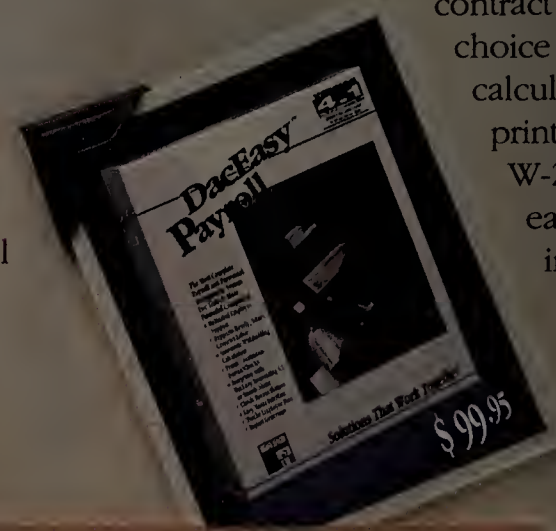

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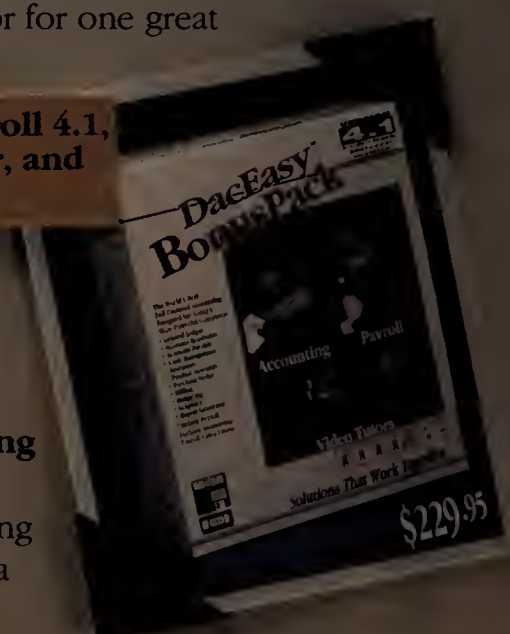

Hardware Requirements IBM or compatible PC's (Light Checkbook for Macintosh-Plus, SE, II) Accounting 4.1-640K, Hard disk, DOS 3.1 or later, mouse optional. Payroll 4.1 512K, Hard disk, DOS 3.1 or later, mouse optional. Network Accounting-Net Bios Compatible LAN, 640K, DOS 3.1 or later, mouse optional. Sylvia Porter's RapidTax 512K, Hard Disk, DOS 2.1 or later. Accounting 4.1 512K, 2 disk drives DOS 2.1 or later. Light Checkbook Accounting (PC)-256K, One Disk Drive, DOS 2.1 or later. Macintosh is a trademark of Apple Computer Inc. DacEasy, Light, and RapidTax are trademarks of DacEasy, Inc.

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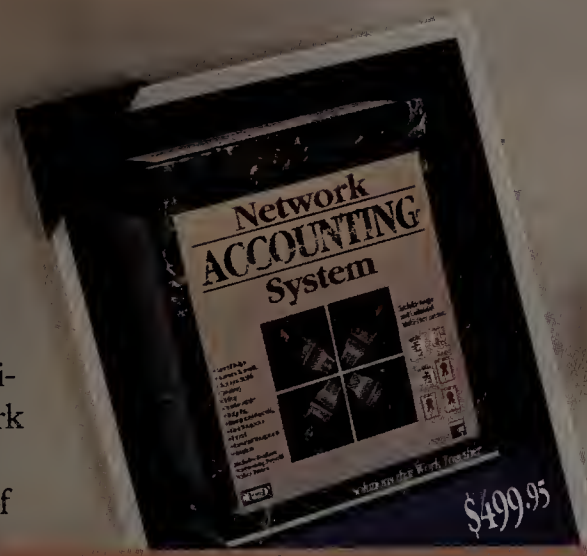

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"DacEasy Accounting Network System, the product to watch for."
-Lotus Magazine
December, 1990

You can file your 1990 taxes with confidence with **Sylvia Porter's RapidTax™**. This easy-to-use 1040 program features a simple interview filing option, built-in IRS Tax Tips and an Audit Detector. You also get FREE electronic filing software for quick refunds and DacEasy Light Checkbook Accounting for FREE.

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QwikShare is a low-cost system, but gives you "no-wait" printer sharing found on more expensive buffered units. Printing tasks are removed from your computer screen instantly. So instead of waiting for the printer to complete your job — or someone else's — your productivity continues.

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Installation is a snap. Just connect QwikShare between any standard laser, PostScript® or dot-matrix printer and up to six PCs. Load the software and you're all set! And QwikShare is compatible with all popular graphics, spreadsheet and word-processing software, including Microsoft® Windows.

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QwikShare is so reliable, it's backed with a full **three-year** limited warranty. And WTI technical assistance is available via toll-free 800 number. So if you're looking for quick and easy printer sharing, just snap-up a QwikShare System from WTI.

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For more information on QwikShare and other members of the LASERNET printer sharing family, or the location of the nearest Western Telematic dealer, call us toll free at **1-800-854-7226**, FAX 1-714-583-9514 or write Western Telematic Inc., 5 Sterling, Irvine, CA 92718.

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Circle 325 on reader service card

because FormBase *lacks certain relational capabilities, such as outer joins and many-to-many links. —Ed.*

An Avoidable Delay

The "Step-by-Step Guide" in September's *Help Screen* provides an effective means of enabling multiple configurations, but I came across a frustrating quirk. If you have a program such as *PC Tools Deluxe*'s cache that delays the write to disk, BOOT.BAT copies the files correctly but reboots the computer before the cache has a chance to write the files to disk. You get the configuration you thought you'd changed. With *PC Tools,* it was simple to disable the write delay, and all is working fine now.

Timothy D. O'Brien
Rochester, New York

A Fistful of Marek

I enjoyed the November piece on Mark Marek, the artist behind *Two-Fisted Management.* Does Marek have any cartoon books published? If so, can you tell me where I can purchase them? I love his business humor!

Michael Uhrbrock
San Juan, Texas

Mark Marek's Two-Fisted Management *is published by Topper Books, 200 Park Ave., New York, NY 10166. —Ed.*

Superstore Switch

Your graphical representation of leading software retailers on page 80 of December's *Industry Outlook* contained an error and an omission. The store counts for Walden Software and Software Etc. were reversed—Walden is the smaller of the two chains, with 65 stores, while Software Etc. has 225 locations. Also, you omitted mention of Electronics Boutique, a nationwide chain with 206 retail stores. We carry over 1500 software titles for IBM compatible, Commodore, and Apple systems.

Steve Shendelman
Director, Retail Store Operations
Electronics Boutique
West Chester, Pennsylvania

Our Industry Outlook *item on software-only superstores dealt with chains primarily selling PC-compatible business software. Electronics Boutique handles a sizable proportion of home and entertainment titles and, as Mr. Shendelman points out, many non-PC applications. He is correct about the error in our infographic.* PC World *regrets the error. —Ed.*

Corrections and Clarifications

In November's *Information Edge* column, "The Professional Edge" sidebar discussed Trademarkscan, a dial-up data base available on Dialog from Thomson & Thomson of North Quincy,

(continues)

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Massachusetts. Since we ran the item, the service's prices have changed. The prorated connect hourly rate is $130 per data base, and users now pay $1 per image or $1.85 per full-text record with image, and as little as 10 cents per record for other information. The vendor also provides a toll-free search-assistance line that's available M–F 8:30–5.

November's *Information Edge* stated that Dun's Direct Access on-line data base from Dun's Marketing Services of Parsippany, New Jersey, and Dun's Market Identifiers (DMI) on Dialog contain the same information. We also said that the DMI data base contains 2.3 million companies. Actually, the DMI file on Dialog now contains 6.9 million records, and although Dun's Direct Access makes similar information available, each DMI profile on Dialog has almost three times as much information per record.

Send your reactions, responses, and ideas to Letters, PC World, *501 Second St. #600, San Francisco, CA 94107; CompuServe 74055,412; MCI Mail PC World Editorial; or 415/442-1891 (fax). Include your name and the name of your city and state. We reserve the right to edit letters.*

POWER TIP NO. 165

Finding Your WordPerfect 5.1 File Name

If you want to save an ASCII file as a *WordPerfect* document or vice versa, *WordPerfect 5.1* makes you type in the file name before you save it. To save it under the same name, just press <Shift>-<F10> at the 'Document to be saved' prompt, and *WordPerfect* will insert the file name.

G. Jonathan Cox
Orem, Utah

Why FastData?

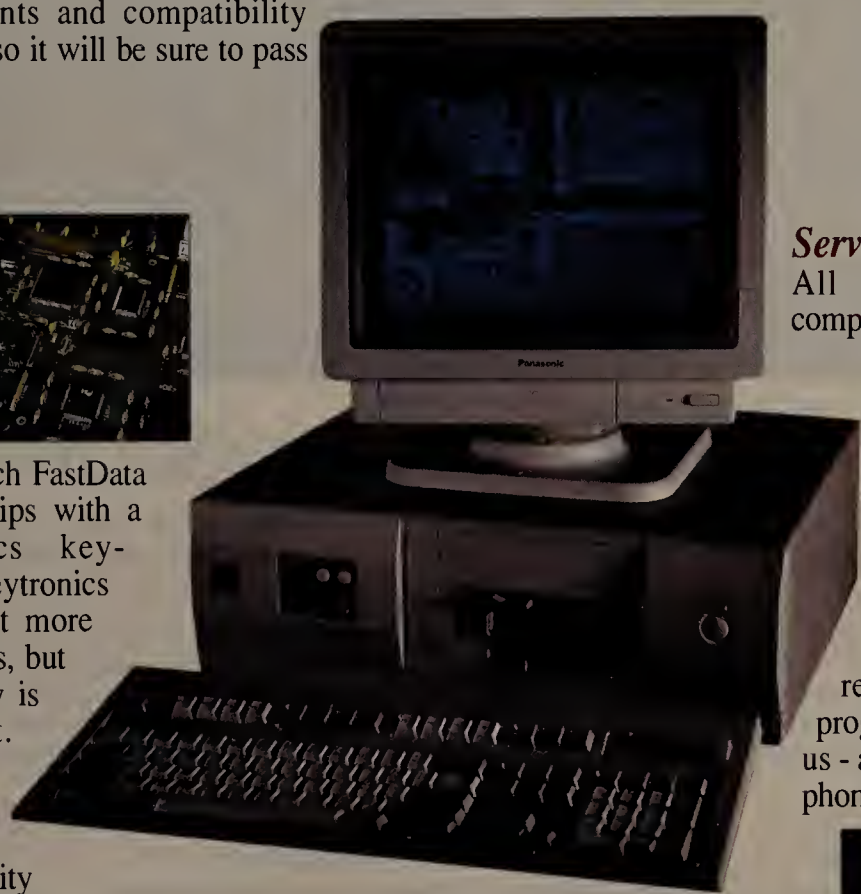
A personal computer is a large investment; before you choose, we want you to know what to expect when you purchase a FastData personal computer from FastMicro.

Superior Design.

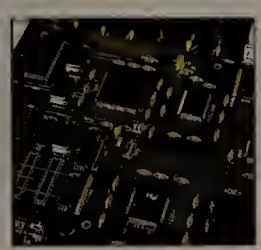
You get more out of your FastData personal computer because we put more into it. We've been building PC's longer than most of the competition and we put that experience to work for you. We use proven designs that pass our stringent performance requirements and compatibility standards so it will be sure to pass yours.

Full Support.

Our team is standing by and ready to make your FastData computer perform to its greatest potential for you. When you buy a FastData computer, you're covered by Toll-Free technical support for life. And since we sell more software than other computer companies, we are uniquely qualified to give the proper support the customer deserves.



Better Components.



The whole is only as good as the sum of its parts; and FastData systems use some of the best parts in the industry. For example, each FastData system ships with a Keytronics keyboard; Keytronics costs a lot more than others, but the quality is worth it.

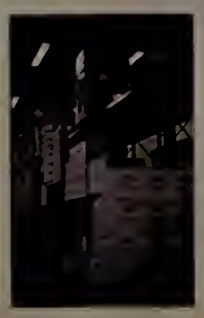
Our systems use exclusively Toshiba floppy drives, the industry leader. Standard equipment includes other quality components from Western Digital, Phoenix, Chips & Technologies, just to name a few.

Service.

All FastData personal computers come with a full one year warranty, but that's just the start. In the unlikely event your computer is down, it is our goal to get back up and working as quickly as possible - and we back it up with action. Call us toll-free and we'll work with you to determine the problem; if a part breaks, we will send you the replacement part through our FastSHIP program - before the broken part is returned to us - and we'll pay the freight both ways. If our phone support or FastSHIP program can't solve your problem, we will service it on-site to most U.S. locations or replace your computer at no charge. Now that's service.

Selection.

Our face to face retail background has made us never forget that the customer comes first and that a personal computer is just part of a customer's overall needs. That's why FastMicro offers thousands of hardware and software products to enhance your new personal computer. In fact, our competition will probably tell you to call us when you need something to run on their personal computer.



Risk Free.

We pass the test for the choosiest of customers; in fact, FastMicro sells to over half of the Fortune 500 and Universities in 47 states (we're working on the rest). These people buy for a living and rely on us, you can too. You can do more than take our word on it - go ahead and purchase any FastData brand product from FastMicro and if you are not thoroughly satisfied after 30 days, you can return it for a full refund of the purchase price.

Circle 100 on reader service card

FastData 386 Systems

FastData 386/33 $2399

The fastest 386 processor available combined with a 64K thirty nanosecond memory cache make the FastData 386/33 a power users dream! Included in the base price is a 100 megabyte 20 millisecond hard disk, 1024 by 768 VGA monitor and card, four megabytes of memory, and 5.25" & 3.5" high capacity floppy drives. Plus, should anything ever go wrong with your FastData computer, you are covered by a one-year warrantee with free on-site service or system replacement if we cannot correct the problem with our FastSHIP advance parts replacement program.

Standard Features

- ✓ 33mhz Intel 386-DX processor.
- ✓ 64K high-speed memory cache.
- ✓ 4 megabytes RAM.
- ✓ 100 mb 20ms IDE hard disk, 1:1 interleave.
- ✓ 1.2mb 5.25" and 1.44mb 3.5" floppy drives.
- ✓ Full size (shown) chassis with keylock, speed and reset buttons.
- ✓ 387-DX coprocessor socket.
- ✓ 230 watt power supply
- ✓ 14" Super VGA color monitor, 1024x768 resolution, with 16 bit VGA card with 512K.
- ✓ Clock calendar, parallel port, game port and two serial ports.
- ✓ Keytronics 101 key keyboard.
- ✓ 8 expansion slots & 5 drive bays.
- ✓ Full Shadow RAM and LIM 4.0 EMS support.
- ✓ Windows & Mouse add $99.
- ✓ FCC Class B approved.

System Price	65mb	80mb	100mb	200mb
Monochrome	$1,799	$1,929	$1,999	$2,499
VGA Color	$2,099	$2,229	$2,299	$2,599
VGA 1024	$2,199	$2,329	$2,399	$2,699

FastData 386/25 $1999

The optimum combination of features, expandability, and power make the FastData 386/25 an ideal choice for those whose applications demand high speed 32 bit processing and expandability. The value of the 386/25 goes far beyond its price; it comes configured with a a full four megabytes of fast RAM, a quick 22 millisecond 65 megabyte hard disk, and maximum VGA displaying 1024 by 768 resolution powered by a high-output 16 bit 512K VGA board. Also, the FastMicro team will configure your FastData 386 exactly the way you want, without sending you shopping elsewhere.

Standard Features

- ✓ 25mhz Intel 80386-DX.
- ✓ 4 megabytes of zero wait-state RAM.
- ✓ 65 mb 22ms RLL hard disk, 1:1 interleave.
- ✓ 1.2mb 5.25" or 1.44mb 3.5" floppy drive. (For both add $69)
- ✓ Standard chassis (shown on left) with keylock, speed and reset buttons.
- ✓ 80387-DX coprocessor socket.
- ✓ 200 watt power supply
- ✓ 14" Super VGA color monitor, 1024x768 resolution, with 16 bit VGA card with 512K.
- ✓ Clock calendar, parallel port, two serial ports, and game port.
- ✓ Keytronics 101 key keyboard.
- ✓ 8 expansion slots & 5 drive bays.
- ✓ Full Shadow RAM and LIM 4.0 EMS support.
- ✓ Windows & Mouse add $99.
- ✓ Guaranteed compatible.
- ✓ FCC Class B approved.

System Price	65mb	80mb	100mb	200mb
Monochrome	$1,599	$1,729	$1,799	$2,099
VGA Color	$1,899	$2,029	$2,099	$2,399
VGA 1024	$1,999	$2,129	$2,199	$2,499

FastData 486/25

Call about our hot new 486, just $3,199 with the same standard features as our 386-33 system. Includes a 128K two-stage cache and is expandable to 64mb of memory.

All FastData Systems Include:

- 30 day money- back guarantee
- Toll-free technical support for life
- One year warrantee with on-site service available to most U.S. locations

FastData SX Systems

$1599 FastData SX/20

25% faster than a 16mhz SX, the FastData SX/20 adds even greater performance to its 386 multitasking capabilities. Just $200 more than our SX/16, this machine also includes a second floppy drive in addition to the standard VGA color monitor and 16 bit VGA adaptor, Keytronics keyboard and 40 megabyte hard drive. The system includes two megabytes of memory and is expandable to eight on the main system board. Remember, when you have questions, need to solve a problem, or want recommendations on products for your system, the FastMicro team is standing by toll-free to provide product support for as long as you own your FastData personal computer.

Standard Features

- ✓ 20mhz Intel 80386-SX processor.
- ✓ 2 megabytes of zero wait-state RAM.
- ✓ 40 mb 28ms IDE hard disk, 1:1 interleave.
- ✓ 1.2mb 5.25" and 1.44mb 3.5" floppy drives.
- ✓ Standard chassis (shown) with keylock, speed and reset buttons.
- ✓ 200 watt power supply
- ✓ 14" VGA color monitor with 16 bit VGA card with 256K.
- ✓ Clock calendar, parallel port, two serial ports, and game port.
- ✓ Keytronics 101 key keyboard.
- ✓ 8 expansion slots, 5 drive bays.
- ✓ 80387-SX coprocessor socket.
- ✓ Full Shadow RAM and LIM 4.0 EMS support.
- ✓ Windows & Mouse add $99.
- ✓ Guaranteed compatible.
- ✓ FCC Class B approved.

System Price	40mb	65mb	80mb	100mb
Monochrome	$1,299	$1,369	$1,499	$1,569
VGA Color	$1,599	$1,669	$1,799	$1,869
[illegible]	$1,699	$1,769	$1,899	$1,969

$1399 FastData 386/SX

Combine the benefits of an advanced Intel 386 processor, the value of a 286 and the advantages of FastData and you've got the FastData 386/SX! This machine is the choice of those who want to run today's powerful 386 and multitasking software, like Windows, and also want to run their favorite DOS applications at surprising speeds. We've made our customers' favorite options standard: it comes with an ample two megabytes of memory, a high performance 40mb hard drive, and 16 bit color VGA. Compare performance, features, and service and you will find no better SX value. Interested further? Try the FastData 386/SX for 30 days; you have to be happy - if not, we'll take it back.

Standard Features

- ✓ 16mhz Intel 80386-SX processor.
- ✓ 2 megabytes of zero wait-state RAM.
- ✓ 40 mb 28ms IDE hard disk, 1:1 interleave.
- ✓ 1.2mb 5.25" or 1.44mb 3.5" floppy drive. Both drives add $69.
- ✓ Standard chassis with keylock, speed and reset buttons (mini desktop shown - add $50).
- ✓ 200 watt power supply
- ✓ 14" VGA color monitor with 16 bit VGA card with 256K.
- ✓ Clock calendar, parallel port, two serial ports, and a game port.
- ✓ Keytronics 101 key keyboard.
- ✓ 8 expansion slots, 5 drive bays.
- ✓ 80387-SX coprocessor socket.
- ✓ Full Shadow RAM and LIM 4.0 EMS support.
- ✓ Windows & Mouse add $99.
- ✓ Guaranteed compatible.
- ✓ FCC Class B approved.

System Price	40mb	65mb	80mb	100mb
Monochrome	$1,099	$1,169	$1,299	$1,369
VGA Color	$1,399	$1,469	$1,599	$1,669
VGA 1024	$1,499	$1,569	$1,699	$1,769

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Hardware

DISK DRIVES

Colorado DJ-10 40-120mb Int. Tape 249
Conner *(see IDE controllers below)*
CP3044 40mb IDE 28ms 269
CP3104 100mb IDE 25ms 499
CP3208 200mb IDE 25ms 849

Mitsubishi 60mb AT Kit

$349 RLL encoding, 1:1 controller, and 22ms access time make this a quick performer. The perfect upgrade for your 286 or 386 compatible, this kit comes with everything you need including controller and cables.

Micropolis
MC1664 340mb ESDI 14ms 1395
Miniscribe 80mb IDE 19ms 479
Mitsubishi 60MB AT RLL MR535 269
NEC CDR-3501 External CD-ROM Drive 399
Plus Development
HardCard IIXL 50 - 52mb 9 ms 16bit 399
HardCard IIXL 105 - 105mb 9 ms 16bit 679
Impulse 42mb 12 ms 16bit IDE Kit 399
Impulse 105mb 9 ms 16bit IDE Kit 599

Toshiba 1.44mb Floppy Drive $79

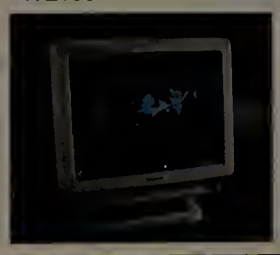
Complete with mounting brackets and installation instructions, this Toshiba works in all true 286 & 386 compatibles. Will also read/write/format 720K 3.5" disks. Rails, add $5.

Seagate
30MB XT Kit ST238 w/ cont. 249
40MB AT ST251-1 MFM Drive 239
40MB AT ST157A 28ms IDE Drive 249
80MB AT ST296N SCSI Drive w/adaptor 349
89MB ST1102A 19ms IDE Drive 419
125MB ST1144A 19ms IDE Drive 499
210MB ST1239A 15ms IDE Drive 799
330MB ST2383E 16ms ESDI Drive 1289
Teac
720K 3.5" Floppy 59
1.2MB 5.25" Floppy 65
1.44MB 3.5" Floppy 65

Toshiba 100mb IDE Kit $549

Upgrade your 286 or 386 to IDE technology and Toshiba quality at a FastMicro price. This kit comes with a fast 20ms 105mb drive and built-in 1:1 controller, 16 bit IDE card with dual floppy controller and cables, 5.25" brackets and rails. Call our experts for all your drive needs. Model MK234FC.

Toshiba
360K 5.25" Floppy (Black) 69
1.2MB 5.25" Floppy 69
1.44MB 3.5" Floppy 69
65mb MK134 22ms RLL drive 279
100mb MK234FC IDE 3.5" drive 499
Western Digital Disk Controllers (also see FastData)
WD 16 bit IDE Host - No Floppy/With Floppy 39/49
WD1006V-MM2 MFM AT 1:1 Controller 79
WD1006V-SR2 RRL AT 1:1 Controller 89
WE1007V-SE2 ESDI AT 1:1 Controller 149



Panasonic Super VGA

$439 The Panasonic C1381 will do VGA up to 1024x768 interlaced resolution. It has a dot pitch of .28 and is compatible with all standard VGA cards. Includes swivel base and VGA cable.

BOARDS

Artisoft/Lantastic
Lantastic 2mbps Starter Kit - Two Station 369
Lantastic 2mbps Adaptor 169
Lantastic Ethernet Starter Kit - Two Station 499
Lantastic Ethernet Adaptor 239

ATI VGA Wonder + $189

New and improved, the ATI VGA *WONDER+* is faster than VRAM. It does interlaced and non-interlaced 1024x768 modes, is 100% register compatible, and comes with extensive software drivers. A free mouse is included as an added bonus. 512K version $219.

ATI
2400 ETC Internal ..... Call
2400 ETC External 187
9600/E External MNP V.42bis 479
VGA Basic 16 75
VGA Wonder + 256K 189
VGA Wonder + 512K 229
Brown Wagh Sound Blaster 149
Everex
1200B Int Modem 55
2400B Int Modem 99
EGA 480 Card 79
RAM3000 16 bit RAM card 75
RAM8000 16 bit RAM card 169
Hercules Graphic Card + ... 169
Intel
8087-2 115
287XL *Faster than the 80287-10* 199
387-DX20 369
387-SX16 319
Logitech
ScanMan Plus 165
Scanman 256 289
Orchid
ProDesigner 179
ProDesigner II 512/1mb 279/329
Tiny Turbo 286 207
Tiny Turbo Xtra 267
Paradise
Basic VGA - 8 bit 109
VGA 1024 256K/512K 175/199

Practical Modem 9600SA $449

This external modem features V.42 and MNP error correction combined with MNP/5 and V.42 bis data compression to provide total high speed throughput. The PM9600SA is also V.32 TCM, V.32, V.22 compliant and comes with a five year guarantee too.

Practical Peripherals
1200B Int Modem 59
2400B Int Modem 125
2400B Int with MNP 169
PM9600SA Ext. V.32/V.42bis 449
Prometheus
Promodem 1200B Internal 48
Promodem 2400B Internal. 98
Promodem 2400G External 149
Tiara Networking
Lancard/A PC (Arcnet) 75
Lancard/E Star 8 (Ethernet) 139
Lancard/E AT (16 bit Ethernet) 249
USRobotics
2400 Baud Internal 119
2400 Baud External 147
Courier HST 14,400 Ext. 579
Courier HST 14,400 Int. 539
Video 7
VGA 1024i 256K 179
VGA 1024i 512K 209
Vega VGA 149
V-RAM VGA 512K 299

MONITORS

Mitsubishi
1410 EGA 325
Diamond Scan 1381 479
NEC
Multisync 2a 469
Multisync GS 2a 199
Multisync 3d 629
Multisync 4d ..... Call
Panasonic C1381 VGA 439
Princeton ..... Call
Seiko CM1440/1450 ..... 519/659
Sony 1304 Multiscan 669
Zenith 1492 ..... Call

FastData Products

FastData 16 Bit VGA

The FastData 16 bit VGA card features 256K of video memory, does CGA, EGA, & VGA up to 1024x768 and comes with drivers for popular software including Windows 3.0. It's expandable to 512K and has a 30 day money-back guarantee. **$95** 256K Vers. **$125** 512K Vers.

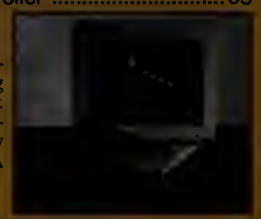
FastData 16bit 1mb VGA 169
FastData CGA Card 35
FastData MGP Card 29

FastData 2400 Baud Internal Modem

$69 The FastData 2400 baud internal modem is fully Hayes compatible and can be configured to COM port 1-4. It has an internal speaker, is auto answer & auto dial, and comes with BitCom software.

9600B SendFax w/ 2400B Modem 99
MFM 16 Bit 1:1 Hard/Floppy Disk Cont. 59
Parallel/Dual Serial/Game Card 29
RLL 16bit 1:1 Hard/Floppy Disk Cont. 69
XT 1.44 Dual Floppy Controller 35

FastData Monitors



Your best value, we have a complete line made for us by leading manufacturers like Samsung & Hyundai. Like all FastData products, you have a full 30 day money back guarantee. Shown is the VGA Color for $279.

FastData Monitors
12" Amber Monochrome 79
14" Amber Monochrome 119
14" White Monochrome 119
14" White VGA Monochrome 129
14" CGA Color .52 dot pitch 199
14" VGA Color .39 dot pitch 279
14" VGA Color .31 dot pitch 319
14" Super VGA 1024 x 768i .28 dp. 349

PRINTERS

Canon BJ10E 319
BJ300 ..... Call

Citizen GSX140

Loaded with features, this 24 pin printer is a hot seller! It comes with 6 resident fonts, paper parking, and Epson & IBM printing modes. It does up to 192 CPS and has a unique LCD control panel that lets you set everything without DIP switches. Upgrade to color anytime for just $39. **$285**

Citizen
200GX 189
GSX140 / GSX145 ..... 285/Call
Diconix 150 Plus 329
Fujitsu DL3400 359
NEC
P3200 269
P3300 369
P6200 469
P6300 629

NEC Silentwriter 2 Model 90 $1645

PC Magazine's editor's choice! The new NEC model 90 comes with 2mb of memory, Postscript by Adobe with 35 fonts, and parallel, serial and Appletalk interfaces. All this and 6 ppm speed, an easy-to-use LCD operator panel and letter, legal, & envelope feed.

OKIDATA ..... Call
Panasonic
KXP1180 155
KXP1124 297
KXP1624 429
KXP4420 Laser 829
KXP4450/4455 Lasers ..... Call
Seiko Smart Label Printer 167
Star
NX1001 149
NX1500 299
NX2410 249
XB2410 / 2415 ..... 429 / 569
Texas Instruments Microlaser PS35 1699

FastData 286/12 $799

Imagine a fast 286 computer at a super price and you've got the FastData 286 12. This system is complete, not stripped. You get one megabyte of zero-wait-state memory and a 28ms IDE hard disk - standard. Also included is an amber monitor and graphics card, your choice of a high density 1.2mb or 1.44mb floppy drive and a Keytronics keyboard. And since its a FastData, you are backed with toll-free technical support, one year warranty with the FastShip replacement program & on-site service plan, and our 30 day full money back satisfaction guarantee!

- ✓ 12mhz 80286 processor.
- ✓ 1 megabyte RAM.
- ✓ 40 mb 28ms hard disk 1:1 interleave.
- ✓ 1.2mb 5.25" or 1.44mb 3.5" floppy drive
- ✓ Standard chassis (shown with optional chassis - $50)
- ✓ Five drive bays.
- ✓ 200 watt power supply.
- ✓ *287XL* coprocessor socket
- ✓ Monochrome monitor with monochrome graphic board.
- ✓ Clock calendar, parallel port, and two serial ports.
- ✓ Keytronics enhanced 101 keyboard.
- ✓ 8 expansion slots, 6 available.
- ✓ Full documentation.
- ✓ FCC Class B approved.

System Price	40mb	65mb	80mb	100mb
Monochrome	$799	$869	$999	$1,069
VGA Color	$1,099	$1,169	$1,299	$1,369
VGA 1024	$1,199	$1,269	$1,399	$1,469

FAST MICRO

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Software

DATABASE & FORMS

askSam 5.0	209
Avery List & Mail Plus	37
Clarion Personal Developer	45
Clarion Professional Developer	449
Clipper 5.0	489
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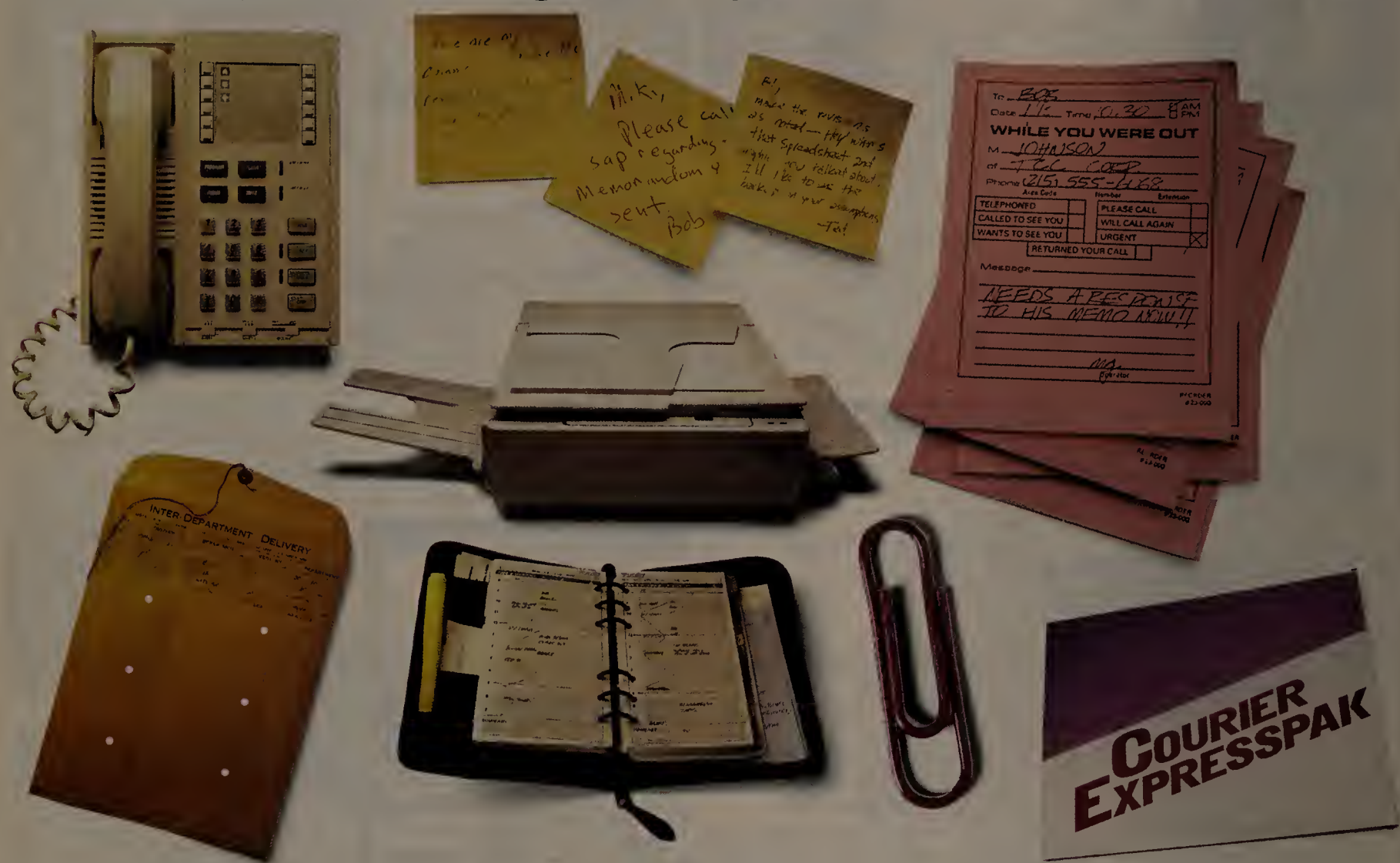

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THE HELP SCREEN

PC World offers answers and advice at every level

Find the best laptop screen, unload TSRs using batch files, capture PC graphics on your VCR, teach DOS 4.01 and WordPerfect to SHARE, ease into COBOL, power up properly, read your old CP/M disks, jump directly into WordPerfect's Macro Editor, and improve LAN printer sharing.

Karl Koessel and Robert Lauriston

ANTHONY RUSSO

Laptops: Backlit Versus Sidelit Screens

Q. *Some companies advertise their laptop screens as backlit, while others call theirs sidelit. Is there a difference, and if so, which is better? I notice that October 1990's Best Buys, the Sharp PC-6620 and Texas Instruments TravelMate 2000, are advertised both ways. What kind of screens do they have?*

Harry K. Wong
Sunnyvale, California

A. Both backlit and sidelit screens are illuminated by a diffusion plate (a plastic screen that spreads light evenly) behind the liquid crystal display. In a backlit screen, the fluorescent tube that actually provides the light is behind the diffusion plate; in a sidelit screen, it runs along one edge.

Manufacturers disagree about the respective merits of the two kinds of lighting, perhaps because they're constantly improving both. For instance, one vendor told us sidelit screens are thinner, lighter, and use less power, but backlit screens have slightly higher contrast; while another told us *backlit* screens are thinner and lighter, *sidelit* screens have better contrast, and the power consumption of both is about the same.

Luckily, whether the screen is backlit or sidelit is not an important factor in deciding which laptop to buy. Since a lighter, more energy-efficient screen may be offset by a heavier, power-hungry hard disk, you have to judge each laptop as a whole. The bottom line: If the unit's small and light and you're happy with its keyboard, screen, and battery life, don't worry about how the display is lit. Do take a good look at the screen in a variety of lighting conditions before buying, though.

As for the two products you mention, though sold by different companies, they're actually the same computer—and its screen is sidelit.

Unloading TSRs With Batch Files

Q. *I use a combination of TSRs that reduces free memory below the amount required to run some of my applications. I tried to solve this problem with a batch file for each one. Each batch file is supposed to unload the TSRs and start its application, but I still get a message that there's too little memory available. However, after running one of the batch files, I can start its application at the DOS prompt. Is there a solution to this problem?*

David J. Nicol
Seattle, Washington

A. Since your batch file is successfully removing the TSRs, it seems logical that there should be enough free memory to launch your application. The catch is that when you run the batch file, it loads itself into the first available chunk of RAM—on top of the TSRs. Even though it removes the TSRs from memory, the batch file itself is still in the same position in memory, thus blocking DOS from giving your application the hefty chunk of memory it needs.

Luckily, there's a simple workaround: just split the batch file into two. The first one unloads your TSRs, then runs the second to start your application. The second batch file will load into the bottom of the memory released by the TSRs, leaving an unfettered expanse of memory for your RAM-hungry application.

PC Graphics on a VCR

Q. *I would like to be able to use my computer as an aid in video work. Does anyone make a board or adapter that will take what I put on my computer screen—both text and graphics—and output the same into a video recorder?*

James Petrzelka
Cicero, Illinois

A. Anything you can display on your PC's screen you can record on your VCR. All you need is a video board with an NTSC (the U.S. broadcast video

(continues)

standard) output. Such boards have been on the market for a while, but until now they've been very expensive. Luckily for you, several new products have brought the price way down.

US Video's $799 TVGA gives you both standard 640 by 480, 16-color VGA output for your monitor, and NTSC output that feeds the identical image to your VCR's video-in jack. To layer titles and graphics from your computer on top of your videos, you need a $399 "genlock" upgrade that adds an NTSC video-in jack to the board. Add a $449 digitizer module on top of that, and you can even import video images into your graphics or desktop publishing programs.

Willow Peripherals' $895 VGA-TV GE/O offers the same capabilities as the TVGA and the genlock option, plus more colors (256 versus the TVGA's 16), higher resolution (up to 1024 by 768 on the computer monitor and 768 by 483 for the VCR), and Super VHS output. There's no digitizer, though. Super-VGA drivers are included for *Windows 3.0, AutoCAD, Ventura,* and other popular programs. Willow also offers output-only 800 by 600 super-VGA boards for $499 (16 colors) and $599 (256 colors).

WHERE TO BUY

TVGA
US Video
1 Stamford Landing
62 Southfield Ave.
Stamford, CT 06902-7250
203/964-9000, 203/964-1824 (fax)
LIST PRICE: $799
Reader service no. 650

VGA-TV GE/O
Willow Peripherals
190 Willow Ave.
Branx, NY 10454
800/444-1585, 212/402-9603 (fax)
LIST PRICE: $895
Reader service no. 651

WordPerfect 5.0 and DOS 4.01

Q. *I'm having problems running* WordPerfect 5.0 *under IBM's DOS 4.01. For example, after I sort a file I am not allowed to save it, and when I define a new paper size for my printer driver, I can't save that. In both cases I get an error message from DOS 4.01's SHARE utility, which my system must load because its has a drive partition that's larger than 32MB. I tried running* WordPerfect *on another system with a smaller hard disk, and everything was fine. Is this a problem with DOS or with* WordPerfect?

Robert Wilson
Grants Pass, Oregon

A. We checked with WordPerfect Corporation. There is indeed a conflict between *WordPerfect 5.0* and DOS 4.01's SHARE utility, which may (or may not) be corrected in a later release of *5.0.* In the meantime, you could avoid the conflict by partitioning your hard disk into logical drives of no more than 32MB, or you could upgrade to *WordPerfect 5.1,*

(continues)

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which doesn't have a problem getting along with SHARE.

Affordable COBOL

Q. *I need your help in finding a personal COBOL compiler; the* Microsoft COBOL Compiler *is out of my price range.*

Charles Igie
Tallahassee, Florida

A. *COBOL 6.0,* a shareware compiler, can be downloaded from many BBS's and found in user group shareware libraries—look for COBOL600.ZIP. You can also order it direct from the author by sending $25 to to Robert E. Noweck, 115 Lynton Rd., Jesup, GA 31545.

Color-Blind Monitor

Q. *Sometimes when I boot up my PC, I get a series of long and short beeps, as if the monitor and graphics board were incompatible (I have a Compaq Deskpro 386/20e with built-in VGA and a NEC MultiSync 3D monitor). Usually, the machine comes to life as if there were nothing wrong. But on occasion, the image comes up black and white! Our tech support person just gives me a funny look when I bring this up. Is my graphics board going bad, or is it just me?*

Earl Hamilton
Washington, D.C.

A. I'm willing to bet that your system beeps only when you turn on your monitor right after you've turned on the system. The Deskpro's power-up routines check for a 75-ohm signal to indicate that a color monitor is present. Turn on your monitor first, then your system. The Deskpro will detect the monitor—and the problem should go away.

In fact, to minimize the possibility of damaging your system with power spikes that may occur when electrical devices are turned on or off, you—and everyone, including users of systems that don't check for peripheral signals—should make it a practice to turn on everything you'll be using right away (which might exclude printers and modems but includes desk lamps) before turning on your system unit, and to turn off your system unit before turning off your monitor, other peripherals, and lamps.

Reading CP/M Disks

Q. *I've got hundreds of documents on CP/M disks from my old Kaypro I. What's the fastest, surest, easiest, cheapest way to read and write those files on my DOS machine?*

E. Calvin Beisher
Pea Ridge, Arkansas

A. Both Micro Solutions' *UniForm-PC* and XenoSoft's *XenoCopy-PC* will enable your PC to read files from most of the once-popular CP/M systems, including the Kaypro I and II.

(continues)

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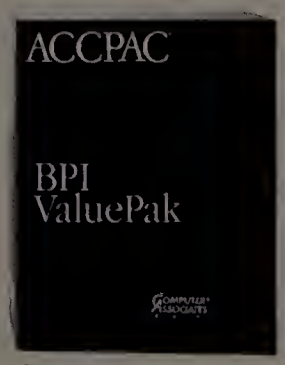

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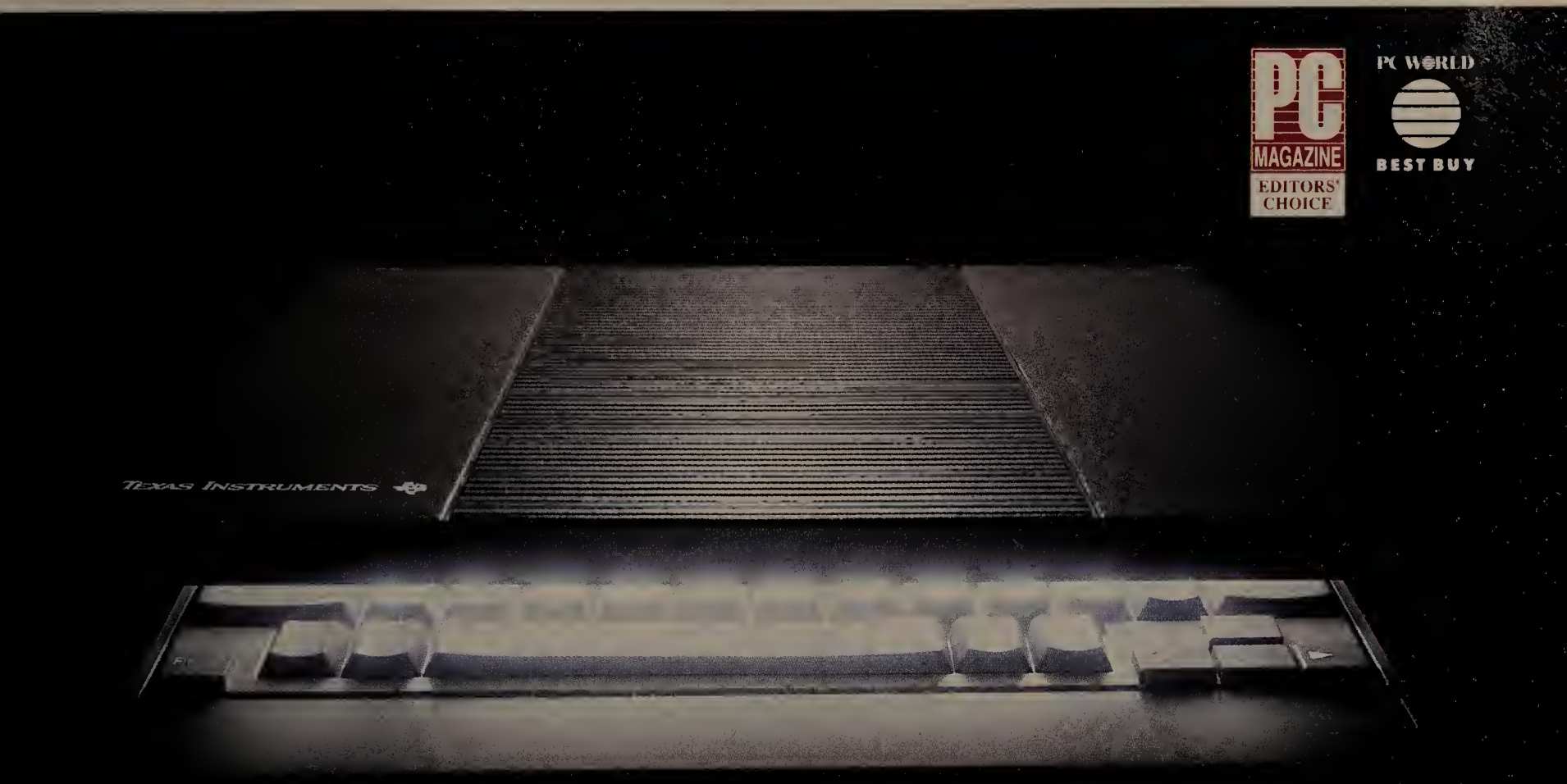

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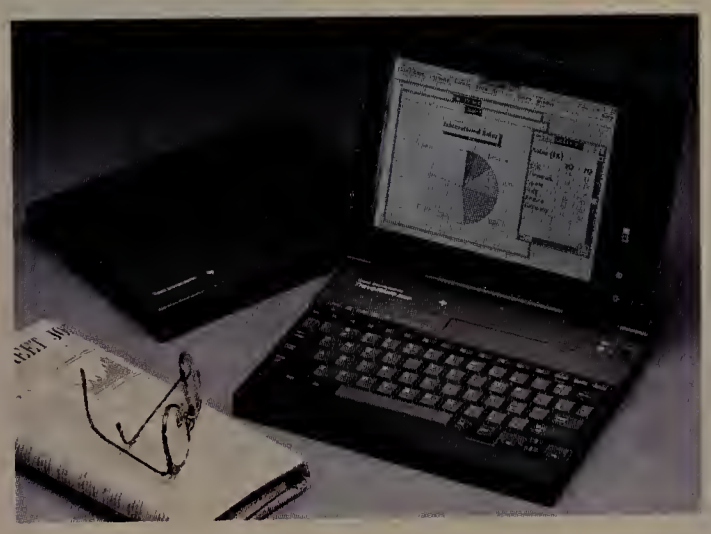

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This is just one of the many utilities you get with Disk Optimizer Tools. They're all designed to give you peace of mind. And give your PC extra performance and security.

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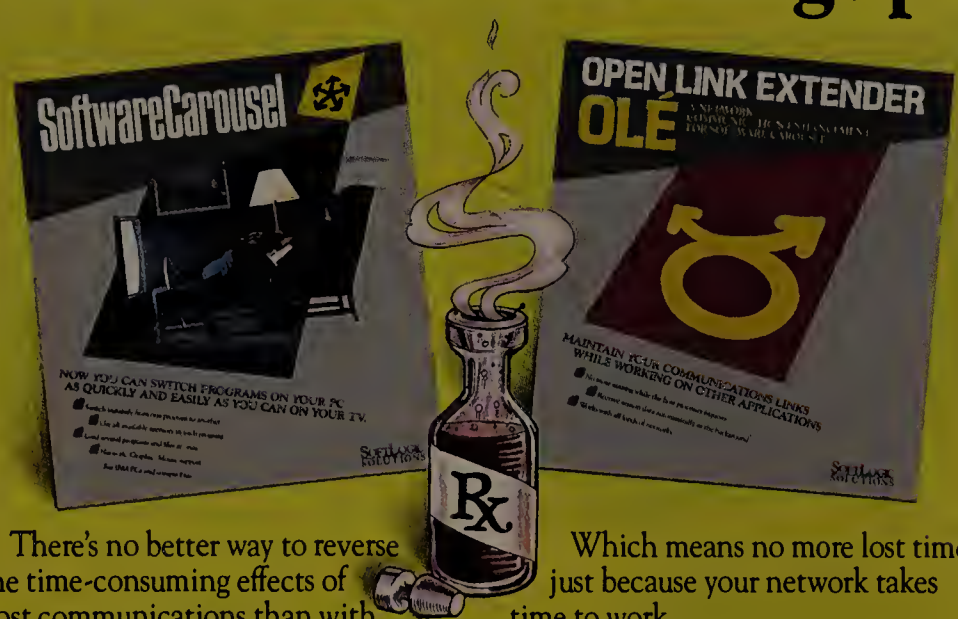
Antidote for host hangups.



There's no better way to reverse the time-consuming effects of host communications than with the Software Carousel/OLÉ team.

Together, they let you connect to your host. Make a request. Switch to another PC application while the host does its work. Then switch back again to receive your data.

OLÉ even lets you know when your data is ready, so you can retrieve it when *you're* ready.*

Which means no more lost time just because your network takes time to work.

Sound like the remedy you need? Call 800-272-9900 and we'll send you complete information. Or see your dealer today. *Requires NETBIOS interface

SOFTLOGIC SOLUTIONS

One Perimeter Road, Manchester, NH 03103
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8

Circle 23 on reader service card

WHERE TO BUY

UniForm-PC
Micro Solutions Computer Products
132 W. Lincoln Hwy.
DeKalb, IL 60115
815/756-3411, 815/756-2928 (fax)
LIST PRICE: $69.95
Reader service no. 652

XenoCopy-PC
XenoSoft
2210 6th St.
Berkeley, CA 94710
415/644-9366
LIST PRICE: $79.95
Reader service no. 653

WordPerfect's Macro Editor

Several readers tell me you *can* create macros using *WordPerfect 5.1*'s Macro Editor (see January's *Help Screen*). Just press <**Home**> before pressing <**Ctrl**>-<**F10**> (Macro Define).

How does...? What can...? Should I...? Send your PC questions to The Help Screen, PC World, *501 Second St. #600, San Francisco, CA 94107-1431; CompuServe 74055,412; MCI Mail PC World Editorial; or 415/442-1891 (fax).*

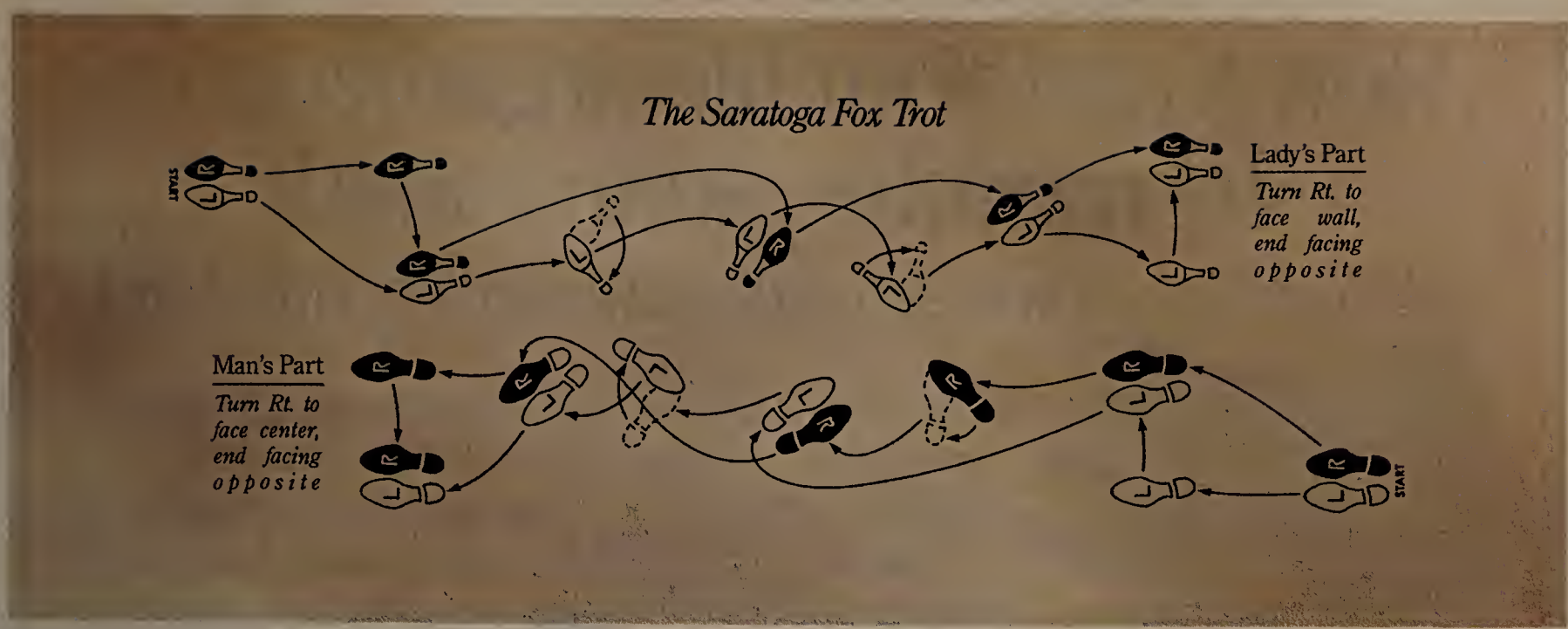
Karl Koessel is the technical editor and Robert Lauriston a contributing editor for PC World.

POWER TIP NO. 166

The Ventura Dialog Box Two-Step

Tired of the click click click of the mouse? Consider *Ventura's* <Ctrl>-X shortcut. If you want to cancel and escape a dialog box, just press <**Ctrl**>-**X**. If you need to jump back to the last dialog box used, press <**Ctrl**>-**X** again.

Karl Anthony
Technical Specialist
Ventura Software
San Diego, California



There's a time and place for complex steps. Communications isn't one of them.

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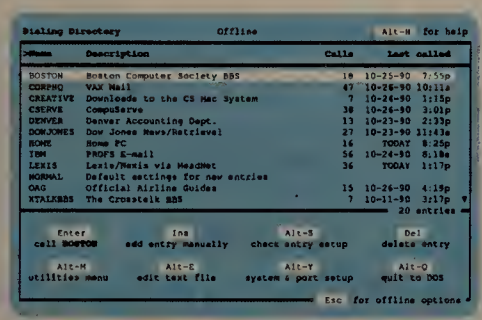

Unlimited connections are one step away with our dialing directory.

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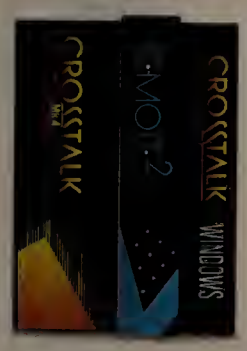
Like emulation of ANSI color graphics, Televideo® 900 series, IBM® 3101, DEC VT™ 52, VT102, VT220, and VT320 terminals. And support for block mode, printing, wide screens and other various advanced features.



These products are an economical upgrade away.

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Routine tasks can be automated without programming, utilizing our LEARN feature. It records your keystrokes and automatically creates scripts in CASL,™ our industry standard scripting language. All you do is touch one key and replay when needed.

Plus, CROSSTALK Communicator includes offers for CompuServe, OAG,® Dow Jones News/Retrieval and other on-line services worth over $150.

Trade in now for $34.95.

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Best of all, CROSSTALK Communicator is a great deal at only $99. And, for a limited time, you can trade in any asynchronous communications package, regardless of who you bought it from. **Trade up today and get CROSSTALK Communicator for only $34.95 by calling 1-800-348-DCA1 ext. 67C.*** Could anything be simpler?

DCA

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(30 minutes if you skip ahead to the 800 number.)

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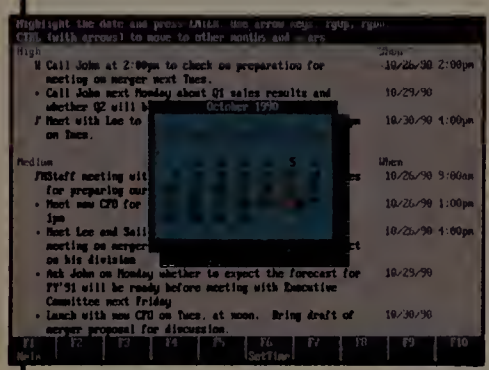
Your ten minutes are about up. Get back to work.



Lotus Agenda 2.0 is so easy to work with, you'll start getting better control of your professional life within 30 minutes.

Lotus Agenda

Introducing New Lotus Agenda 2.0

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NETWORK Q&A

Flexible Printer Sharing for Your Local Area Network

Keith Nickerson

Q. *One of the benefits of a local area network is supposed to be printer sharing. As our organization has grown, though, we have outgrown NetWare 286's printer-sharing abilities. It is no longer practical to hang printers only off the file server; we need more flexibility in the location of these shared printers. I have recently read of products that claim to add more printer-sharing capabilities to networks, but it is difficult to decipher the pros and cons of each. Could you clarify what products are available that could help us to put our printers where they are needed, and explain the features and drawbacks of each?*

Prandit Singh
Durham, North Carolina

A. Until recently, shared printers had to be attached to file servers, and each could handle no more than five printers. Often, this arrangement is inconvenient, and it makes securing your file server complicated. In February 1990, Novell began shipping its NetWare Print Server (which is also known by its executable file name, PSERVER) with Advanced NetWare and SFT NetWare (NetWare 386 has added a similar feature since its release). PSERVER adds several much-needed print server features to NetWare, including the ability to share up to 16 printers and to attach them to workstations as well as to servers.

However, the only way to get PSERVER is to buy a new copy of NetWare 286 or upgrade to the latest version; you can't purchase it separately. Fortunately, there are several third-party print server solutions with the same functionality as PSERVER, if not more, at less cost than a NetWare upgrade.

These third-party products fall into two categories: software solutions and hardware solutions. The software solutions let you share printers attached to any workstation that's running a print server TSR. (The print queue itself is still maintained on the file server.) RAM requirements for the different products vary, with some taking as much as 190K. LANSystems' *LANSpool*, a *PC World* Best Buy (see "Printer Power: NetWare Pop-Up Utilities," October 1990), needs only 6K. It also lets everyone on the LAN, not just those at the print station(s), switch printers and manage print queues without exiting their applications or shelling out to DOS.

PSERVER and the other software-based solutions make printer sharing more flexible, but they have some drawbacks. Primarily, there is the risk that users running other programs on the print station will crash or lock up the system, disabling the print server TSR. You can eliminate that possibility by dedicating a PC for use solely as a print station, but that ups the price radically. Also, software solutions require that printers be placed near the print station, which is not always convenient.

Several hardware-based solutions overcome the software products' limitations. Tiny, self-contained print servers with their own LAN connections, like Intel's NetPort and Castelle's LANpress, let you place a printer anywhere on your network cable. Installing these print servers is simpler than installing software-based solutions, and you're no longer confined to placing printers near workstations. These devices support various protocols, cable types, and numbers of printers.

The products just mentioned offer help for NetWare's printing handicaps, but what about other NOS's that suffer the same limitations? Banyan offers a pricey peer-printing add-on for VINES, but there aren't any printer sharing enhancements available for *3+Open*, *Microsoft LAN Manager*, or *IBM LAN Server*. Most of the vendors mentioned here claim to have plans in the works to release versions of their products for these other NOS's but appear to be waiting for sufficient demand to justify development costs. If you're feeling the printer sharing limitations of one of these other NOS's, contact the third-party print server vendors and inquire about their plans to support your NOS. Your requests are the biggest motivator in initiating development of new and needed products.

Keith Nickerson is the editor of NetWare Advisor *and a member of the publishing team of Business Systems Group, a Houston-based network consulting firm.*

WHERE TO BUY

LANpress
Castelle
3255-3 Scott Blvd.
Santa Clara, CA 95051
800/359-7654, 408/496-0502 (fax)
LIST PRICE: $795 to $1395
Reader service no. 654

LANSpool 2.0
LANSystems Inc.
300 Park Ave. S
New York, NY 10010
800/458-5267, 212/995-8604 (fax)
LIST PRICE: $395 per server
Reader service no. 655

NetPort
Intel PCED
Inside Sales C03-04
5200 N.E. Elam Young Pkwy.
Hillsboro, OR 97124
800/538-3373, 503/221-6953 (fax)
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CD-ROM: The Inform

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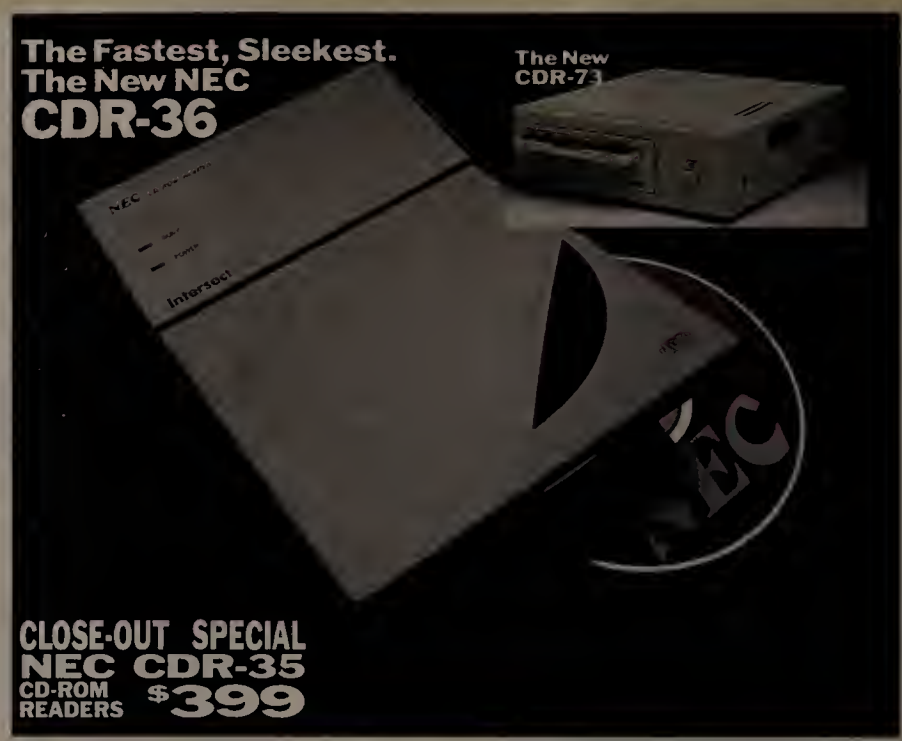

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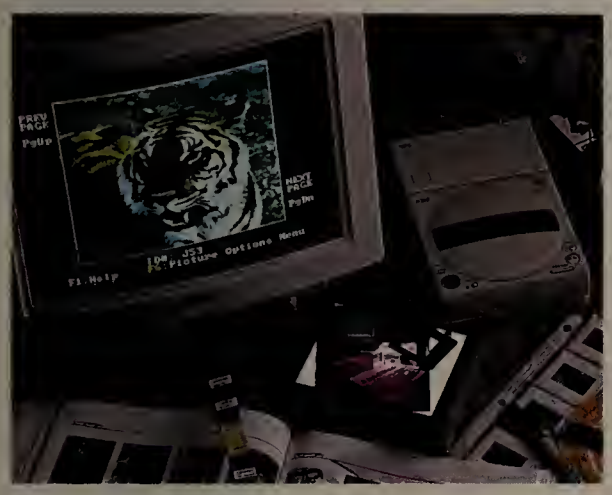

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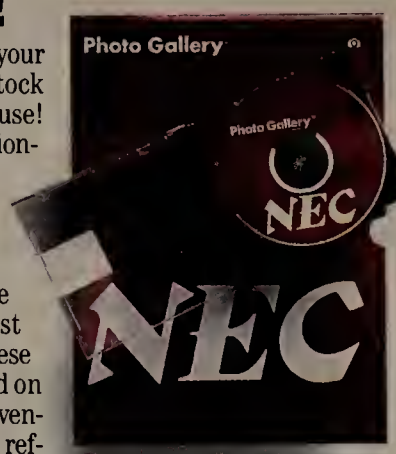

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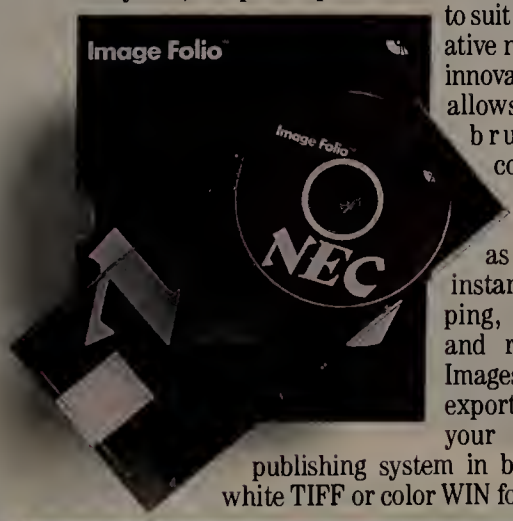

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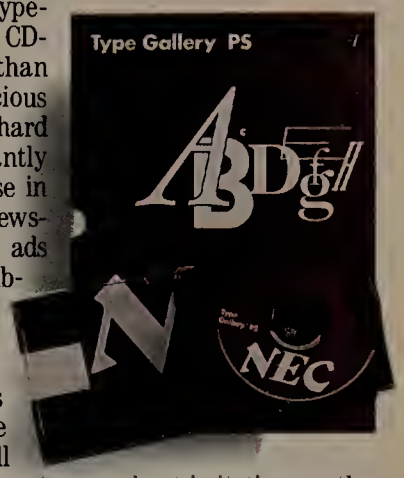

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When sending a fax to multiple locations on a stand-alone fax machine, you have to stand there, hand-feeding the document through the machine once for each destination — in other words, a waste of human resources. With your Fax96 phone directory, you simply select your destinations and Fax96 handles everything from then on. Send right away or pick a time when phone rates are low. Your time is free to do other things.

Full 9600 bps Group III Facsimile Capability.

In the late 70s, fax machines took 6 minutes to transmit a page. That was fast then, but way too slow today. Modern Group III fax systems transfer a full page every 10 to 30 seconds! Fax96, handling faxes at 9600 bits per second, puts the latest technology to use for your benefit — faster transmissions meaning lower phone bills.

Background Receive Operation.

Fax96 is always ready to receive. Run WordPerfect, Lotus 1-2-3, whatever you like. When a fax arrives, Fax96 answers your phone and stores the incoming fax on your disk. A small window pops up letting you know its arrived. You can then display the fax on your screen or print it on your printer. You'll never miss a fax again.

Advanced Sending Operation.

However you want to send, Fax96 will automatically handle it for you. Broadcast the same fax to several people, that you easily select from your Fax96 phone directory. Select several faxes to send out at the same time, thus sending multiple files. Or schedule faxes to be sent in the wee hours of the morning when rates are at their lowest.

Features:

- Full 9600 BPS Group III compatibility.
- Background Receive operation.
- Automatic Transmittal Sheet generation.
- Automatic Redial.
- Automatic Log of sent and received messages.
- Compatible with laser and dot-matrix printers.
- Familiar "push-button" fax machine look and feel.
- Shares your existing phone line.
- Remote control for sending faxes.
- 100% money-back guarantee.

Direct Scanner Control.

With your scanner, Fax96 will directly control the scanner and send the image as a fax. Fax96 supports all the popular scanners. If you want to use your own scanner program, simply save the image as a .TIF or .PCX file, then send it from Fax96. What? You don't own a scanner? Here's a trick — have a friend fax you the image. Then you can fax it to others.

Loads of Special Features...

The list of features that Fax96 gives you goes on and on. Automatic transmittal cover-sheet generation with enough "comments" lines to be a short fax all by itself. Automatic redial in case the called number is busy. An automatic log of sent and received faxes. Printing compatibility with lasers and dot-matrix printers. And perhaps best of all, familiar "push button" fax machine look and feel. You'll know instinctively how to operate Fax96.

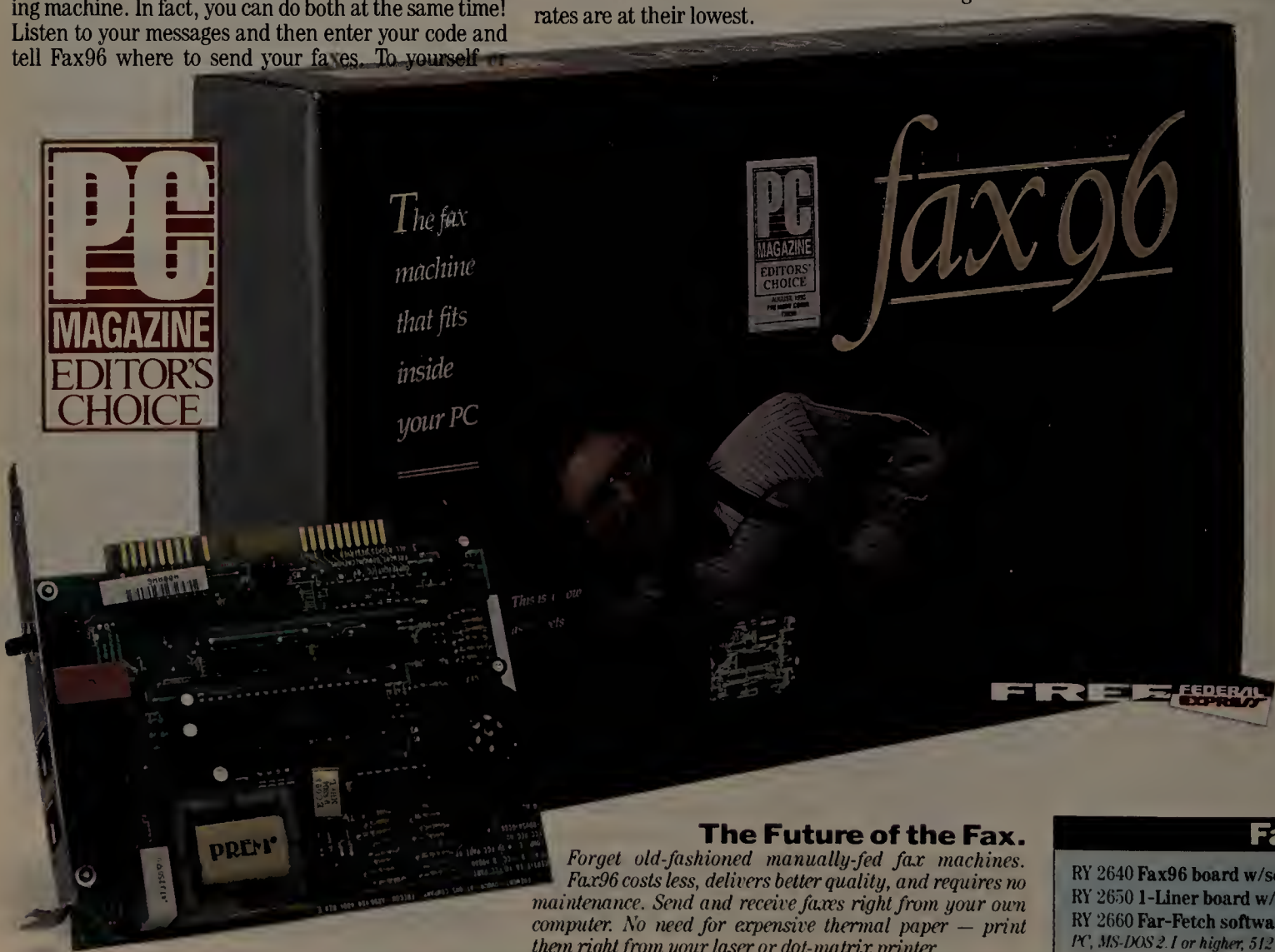
Another Phone Line? Share the One You're with.

Don't install another phone line for your fax. Save money with the "1-Liner" accessory. For only $50, your Fax96 shares your existing phone line, meaning it will automatically recognize and answer another fax machine, or pass a regular voice call to your telephone.

When PC Mag awarded Fax96 their Editor's Choice award, they said:

"Fax96 remains an easy pick because of the value it provides. Its low price and long list of features, plus the excellent image quality and fast transmission times sold us on this product."

Fax machines have multiplied at an incredible rate. There are now more than 12 million worldwide. 1½ million are sold every year in the U.S. alone. Your PC is about to be connected to all of them.



FRECOM

The Future of the Fax.

Forget old-fashioned manually-fed fax machines. Fax96 costs less, delivers better quality, and requires no maintenance. Send and receive faxes right from your own computer. No need for expensive thermal paper — print them right from your laser or dot-matrix printer.

Fax96

RY 2640 Fax96 board w/software	$195.00
RY 2650 1-Liner board w/software	$295.00
RY 2660 Far-Fetch software	$99.00

PC, MS-DOS 2.1 or higher, 512 KB RAM, hard disk.

TIGERSOFTWARE FREE FEDERAL EXPRESS TO ORDER 1-800-888-4437

Circle 259 on reader service card

The Busiest Forms Software in the World!

Just Sit Down and Create a Great Form...

It's easy to see why FormTool is the best-selling forms package in the world. It's the fastest, easiest way to create, edit, manage and print custom, professional forms for immediate information gathering.

TIGER EXCLUSIVE
FREE UPGRADES DURING 1991
ON THIS TITLE

The ability to quickly gather data and put it to work is critical to corporate information flow. FormTool's "Intelligent Line Drawing" and its hardware compatibility make it an indispensable tool for businesses of any size. That's why FormTool has found a home in well over half of the Fortune 500 list, along with thousands of educational institutions, government agencies, hospitals and financial organizations around the world. They've discovered FormTool's productive power.

Unlike its competitors, FormTool doesn't require additional memory, a graphics card, color display, mouse or scanner. It runs beautifully on anything from an XT to a 486. FormTool now supports hundreds of dot-matrix, letter-quality, daisywheel, thermal as well as Hewlett-Packard printers, and new support for PostScript lasers.

Draw Forms Fast.

FormTool streamlines the PC's ability to draw forms. Lines of any weight, boxes of any size, grids of any complexity and more can be quickly drawn with just a few keystrokes. If a grid isn't quite right, one keystroke re-draws it to meet your exact specifications, then displays it on the screen with our WYSIWYG display. Zoom in to see a close-up of your form, then zoom out for the full page view. If you spot a problem, quickly make the revision, preview it again — then print it.

This preview capability combines the advantages of a graphics-based, on-screen display with text-based, lightning-fast processing times and makes FormTool even easier to use — and enhances creativity and accuracy in the design process.

FormTool's ability to make instant revisions to your forms gives you the flexibility to create exactly the proper form to meet the precise requirements of your work flow. And FormTool is so simple to use, it's ideal for users of any experience level.

No other forms package delivers the productive drawing power of FormTool.

Enter Text in Seconds.

To handle text, FormTool contains a forms-oriented word processor that allows you to move quickly through the form inserting captions, instructions, word-wrapped text and special symbols, and characters. FormTool will enter your text into position automatically.

An All New Forms Manager.

And FormTool Gold contains an all new Forms Manager that makes organizing, retrieving and archiving forms faster and more efficient. Includes a built-in backup and restore, the ability to instantly view forms from a list on your screen and a new set of features that allow you to "move," "copy," or "delete" forms from the Forms Manager.

FormTool's Forms Manager also includes hard disk directory support, allowing you to store forms anywhere — or you can assemble form sets in just seconds using the sleek new menu system. There's an all-new automatic "Backup and Restore," a new "View Form" feature — even an innovative directory system for fast, efficient archival.

All New PostScript Support.

FormTool now allows you to quickly print your forms on PostScript and compatible laser printers without conversion or special commands. Simply select your printer type from the configuration screen and print. You can add your company name to your forms.

Horizontal And Vertical Line Drawing.
All you have to do is position the cursor where you want to draw a line. Then hit one key, and FormTool will automatically draw the line.

Any Type Style.
Choose from italic, underlined, bold, bold italic, superscript, subscript and user defined styles.

Large Letters.
You can select large letters, and even oversize letters up to one inch tall.

Line Width.
Just specify single, double, or bold lines, and FormTool will draw them. You can also switch between single, double and bold lines with one keystroke.

Form Fill-In & Merge.
You can easily set this form up as a template for filling in — to be printed, or stored.

Automatic Grid Drawing.
Drawing a grid is easy — just specify: column width, row height, number of columns, number of rows, or leave any out, and FormTool will automatically draw the grid based on your specifications.

Form Size.
You can select from any standard size such as letter, legal, or computer. Or, you can specify a custom size from postage stamp to 13½ inches.

Perfect Corners.
FormTool will end every line with perfect corners and T's — everytime. It will even "pipe" double lines.

Fully Supports All Attributes of Your Printer.
You can "plug in and print" over 300 dot-matrix, ink jet, thermal, letter quality and laser printers.

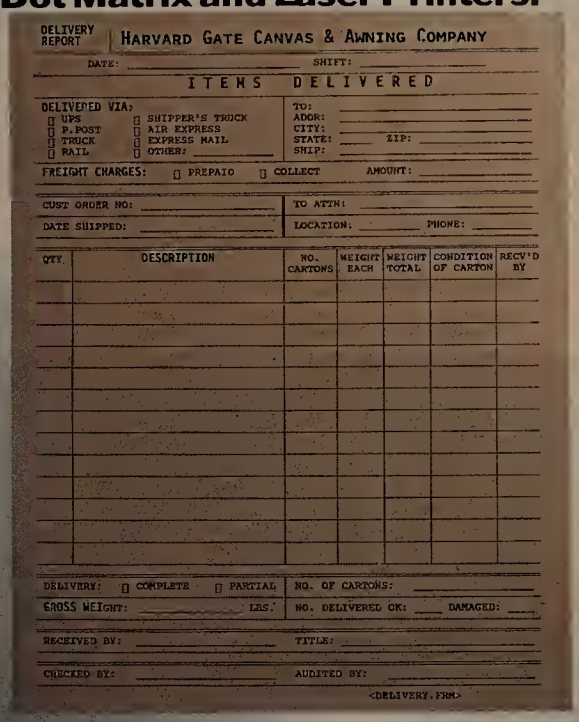
- Insert text vertically or horizontally.
- Use international character sets.
- Shades, patterns and borders.
- Graphic symbols — arrows, blocks, check marks — even math symbols.

BLOCPublishing

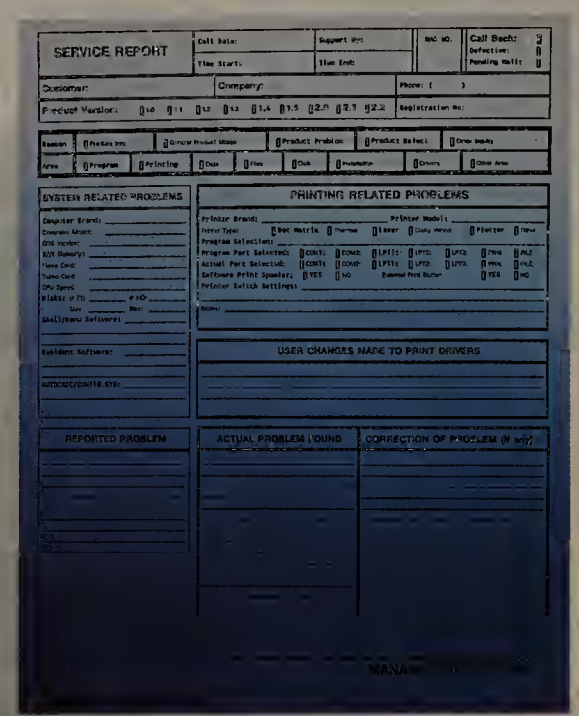
FORMTOOL GOLD

RY 1020 **FormTool 3.0** 5¼" & 3½" **$99.00**
IBM PC, XT, AT, PS/2 or compatibles with 265K. Floppy or hard disk, supports all color or monochrome monitors with or without graphics cards and virtually all dot-matrix printers, daisywheel and laser printer.

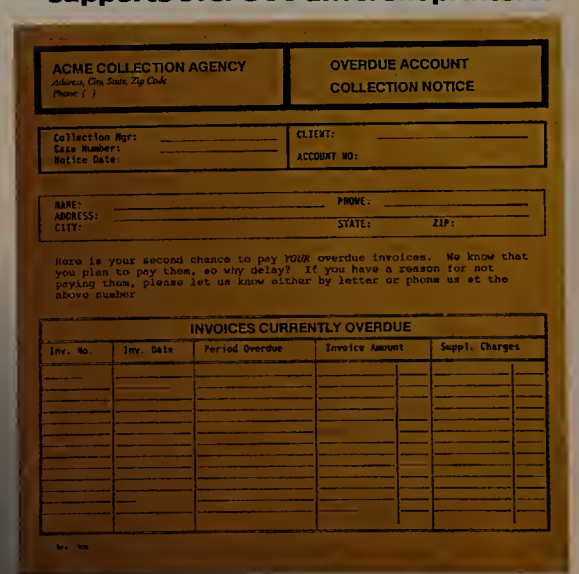
Create Finished Forms in Just Minutes. Supports Virtually All Dot Matrix and Laser Printers!



Instantly draw lines, boxes and grids with FormTool's "Intelligent Line Drawing." Insert text in just seconds.



Large type, precise bold lines & special effects are a keystroke away; FormTool supports over 300 different printers.



Create forms of any size and shape. Make revisions in seconds.

TIGERSOFTWARE FREE FEDERAL EXPRESS TO ORDER 1-800-888-4437

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Back Up Your Files in 0:00 Seconds!

Take the Worry Out of Remembering the Whole Routine.

Why worry if your hard disk is backed up because you forgot to go through your regular back-up routine? With SitBack, the pressure is off you to remember those precious files are just sitting there, potentially to be lost. Just load SitBack into memory and let it do the job in the background while you work. During your computer's idle time and/or at pre-set times of the day, SitBack will go into action and back-up your newly created or modified files. You can even continue to use your PC while the back-up is in progress.

Relax While SitBack Works.

Conventional backup programs force you to put the back-up into action. With SitBack, you know your most recent files will always be backed up, giving you up-to-the-minute protection, without lifting a finger. You can back-up to any DOS device on your PC or LAN, including floppy disks, a fixed or removable hard disk, a file server or optical drive. SitBack only takes an additional 14K of RAM so it won't keep you from running your largest applications.

Written up in the major PC publications, SitBack has received wide praise for its simple installation, use and operation. *PC World* said, "SitBack... takes the bite out of hard disk back-up by saving files in the most convenient way — without your involvement."

Loads of Great Features.

Installation is easy with SitBack. With an option that will modify your AUTOEXEC.BAT file, loading SitBack becomes as easy as turning your computer on. A context sensitive help screen is available and hot keys including Pause and Cancel perform several back-up functions without exiting your application program.

SitBack also allows you to back-up only the files which are important to you by setting up one or more back-up configurations.

- **Back-up only certain directories.**
- **Back-up only files with common file name extensions.**
- **Back-up multiple drives to the same or different back-up destination.**
- **Back-up certain files to one destination and others to another back-up destination.**

You can even exclude specific files, files with common file name extensions or entire directories. This prevents you from wasting valuable disk space by only backing up those that need to be backed up.

SitBack does this with the Directory Navigation Utility, which allows you to scroll the directory tree of your hard disk to select the files you want to back-up or exclude from back-up. The beauty of this utility is that it eliminates the need to remember or know how to enter lengthy DOS path filenames and syntax. SitBack's Purge and Restore Utilities make recycling back-up disks and restoring disks second nature. In the case of large files, such as databases, the Large File Back-up/Restore Facility protects these files.

Different Uses and Needs.

- Back-up stand alone PC's to floppy diskettes, another hard disk, removable hard disk (i.e., Bernoulli Box), hard card or to another partition on the hard disk.
- Back-up hard disk based PC workstations to a network file server or another DOS device.
- Back-up selected directories or files on a file server to a hard disk or other DOS device on a local workstation.
- Back-up a file server to a secondary file server or another DOS mass storage device.

SitBack Technologies, Inc.

SITBACK

RY 3170 SitBack 5¼"	$99.00
RY 3175 SitBack 3½"	$99.00

IBM PC/compatible, DOS 3.0 or greater and an additional 14K RAM.

"I Won $28,899 Using This Program!"

A Professional Approach to Winning Pick-6 Lotteries.

On September 8th, one of my tickets had 5 of 6 numbers which had been chosen from the "roll your own" selection. This ticket paid $3,649.50. This was when the Florida lottery was at $50 million. The next week I played eight 10 number wheels and various abbreviated wheels when the Florida lottery was at 100 million. One of the wheels had 5 of 6 numbers and paid $28,899.50. I must say, I am impressed with the Tracker and Wheeler program. The Tracker and Wheeler is a quality software program and very user friendly.

Sincerely, M. P. Burke

We've seen over 30 Lottery software packages in the last year, but only one provides an intelligent, professional approach to winning — and winning often. Specializing in the "Pick-Six" games, Lottery Tracker And Wheeler has actually proven to increase the odds of winning by several hundred times. A unique concept in "wheeling" numbers (playing various combinations of the same numbers) maximizes payoff possibilities on any "Pick-Six" from any state.

Lottery Tracker And Wheeler also has enough power to produce detailed trend charts, record and analyze hundreds of past winning numbers, produce accurate statistics on frequency, recency, percentages and HOT or DUE numbers.

The Pick of the Experts.

Lottery experts agree that Lottery Tracker And Wheeler's sophisticated techniques are the most effective for "Pick-Six."

"We've been playing the Florida Lottery for three weeks using Lottery Tracker And Wheeler, and as a group have won over $1100.00! "

Letters keep pouring in from the Pick-6 winners that have used Lottery Tracker And Wheeler. They're turning the lottery into a science.

Fun and Profitable!

This remarkable system makes playing Pick-6 games fun — and profitable! It can systematically increase your chances of winning by HUNDREDS of times. It includes 20 of the most popular wheeling systems of the world.

By using the power of your PC, you can actually track as many state and international lottery games as you like — there's no limit! As you collect information, you can produce expert "trend charts" to identify "hot" numbers that frequently win. You'll also pinpoint "due" numbers.

Features

- *RECORD* hundreds of past winning lottery numbers and dates.
- *TRACK* as many state and international lottery games as you want — no limit!
- *CHART.* Produce expert trend charts to identify those HOT or DUE numbers.
- *ANALYZE* "hits" four ways: *bell curves* to display overall tracks; *recency* to identify numbers that hit within certain periods of time; *percentages* offering the probability tables for numbers; and *frequencies* to indicate how often certain numbers hit.
- *PRODUCE STATISTICS* for all numbers you play!
- *SELECT NUMBERS* to play 5 different ways! Choose the one you like best.
- *CHECK YOUR BETS* for winning combinations. Records all systems played.
- *PRINT* charts, statistics, recorded numbers and wheeling systems.

ADDED BONUS
"Lottery Winning Strategies" Audio Cassette When You Buy Lottery Tracker & Wheeler.

B O N U S !

Coupon for a FREE WINNING COMBINATION DATABASE!

Every winning combination in your state's history is included to precisely track trends; "hot" and "due" numbers. An invaluable tool for serious players.

ENTERTAINMENT ON-LINE, INC.

LOTTERY TRACKER & WHEELER

RY 6200 Lottery Tracker & Wheeler 5¼	$49.95
RY 6205 Lottery Tracker & Wheeler 3½	$49.95

IBM PC, XT, AT, PS/2 and compatibles. Requires 256K.

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Circle 259 on reader service card

After I Bombed with dBASE, I Almost Gave Up Automating Our Invoices...

PC WORLD BEST BUY · INFO WORLD EXCELLENT VALUE · PC WEEK Rated Number One

...But after a Few Hours with Alpha FOUR, I Had a Fully Operational Application!

Simpler Than dBASE and Paradox — More Powerful Than Q&A!

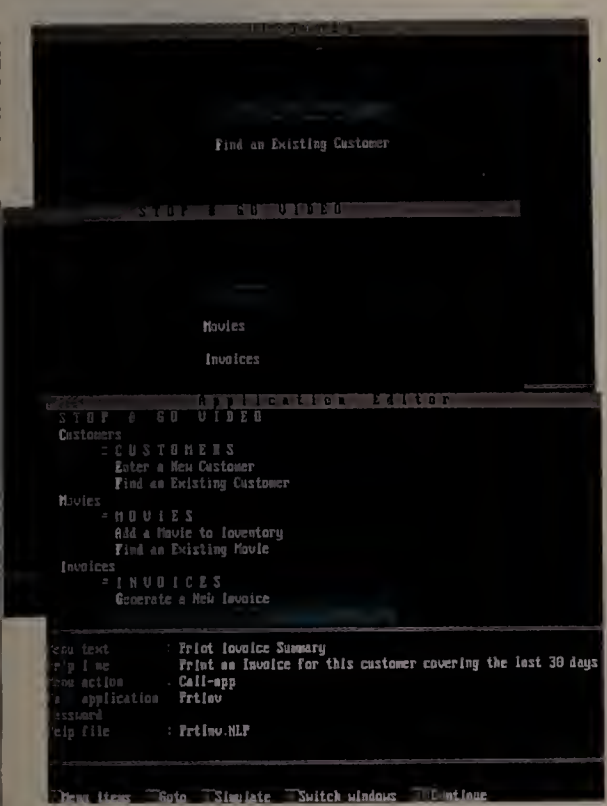
At our Monday morning staff meeting, I announced I was going to automate our invoicing system later that afternoon. Skepticism ran high. "Paul, you promised me an application like that two years ago," said Marge. "You couldn't do it and neither could that dBASE programmer you hired. It'll never happen."

On the other side of the room, Tim, a new employee whispered to Richard, "I didn't know the boss was a programmer too." "He's not," said Richard. "Couldn't write code to save his life. But he keeps trying because he thinks it's vital to the business."

I had already tried three times before to program a database: first with dBASE (much too complicated). Then I tried Q&A (not powerful enough). Then I bought Paradox (just like dBASE). All were either too complicated or not powerful enough.

This time I was confident. Why? Because I just bought Alpha FOUR, the powerful database for non-programmers like me. I spent 45 minutes over the weekend with Alpha FOUR's audio cassette tour. So I knew how easy application designs with Alpha FOUR would be, even the first time. I knew within hours, I'd be able to build a fully relational customer tracking and billing system, complete with custom menus, beautiful screens, extensive help messages and automatic error-correction for trouble-free data entry. And that's exactly what I did. You should have seen Marge's face when the first, perfectly formatted invoice came off the printer!

I Developed My Application in Minutes.



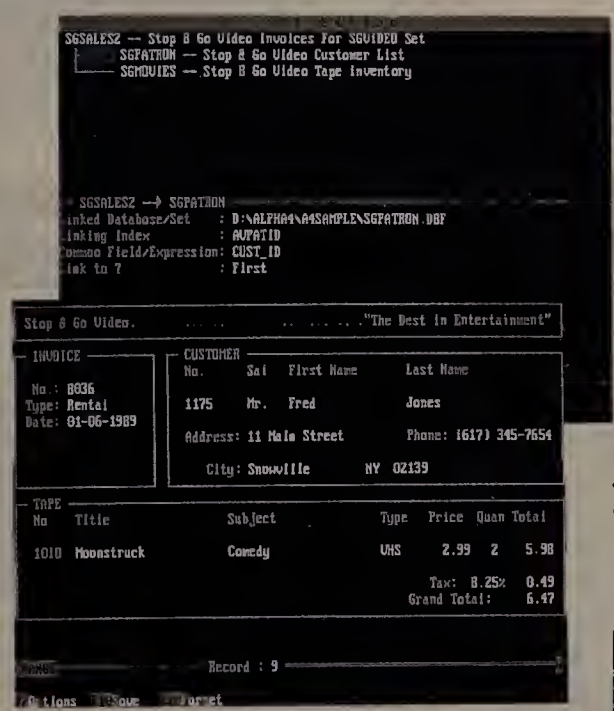
First, I needed a system of menus and sub-menus. Was I ever surprised to see how easy that was! With Alpha FOUR's "Application Editor" I wrote an outline of my menus and sub-menus. (Look at the screen.) Alpha FOUR automatically created my multi-level menus right from there. Changing my menus was just as easy. I inserted and moved a few around until I got it just right — nice and simple for my new employees.

I Made My Data Entry Bulletproof.

I've got a high employee turnover rate, so I needed something simple that a new hire could run right from the screen. I wanted my system absolutely safe and secure, so no "accidents" or mistakes could damage the data I've worked so hard to gather. That's when I really started to appreciate the well-thought-out way Alpha FOUR works. The "validation" capabilities ensure data gets entered correctly. I set it up so Social Security numbers must be 9 digits long (otherwise a custom error message is displayed). When a customer checks out a video, Alpha FOUR checks if he has any videos out over 10 days. If so, my special warning (with instructions) pops up for the clerk. I even set it up so the discount percentage I offer my volume customers has to be entered twice. If Marge enters 1.5% and then 15%, up comes my error message.

When I enter a new customer, Alpha FOUR automatically skips over unneeded fields (determined by my validation rules). And best of all — I use "lookup" fields whenever I can. So when I get to the "Customer Type" field, a window pops up with my choices. All I do is highlight and hit ENTER. No chance of an error!

I'll Never Enter Data Twice Again.



I always ran out of power with other simple-to-use databases; they weren't relational, meaning I couldn't link up separate files that share a common field. But with Alpha FOUR I easily created different databases for customers, invoices and inventory, and linked them all together just by drawing the links between the databases on the screen. (Look at my screen.) Now, we never have to enter the same information twice. I can display and edit information from up to 10 databases on one screen all at the same time. Before, when I changed a customer's address, I had to do it in 3 different places. Never again. And my database files are so much smaller now — because the actual data is only stored in one database.

My Forms and Reports Look Great!

Alpha FOUR's Report Writer was even more impressive. I "painted" reports and invoices on-screen. They looked exactly like I wanted them to — much better than our old paper forms. This "What You See Is What You Get" approach to report writing gives me the flexibility I need to create meaningful and detailed reports that really get my point across. And Alpha FOUR's unique "multiple pass" feature allows me to do complex "percent-of-total" calculations, or place summaries at the top of the report.

Totally dBASE Compatible.

I was delighted to hear Alpha FOUR is totally compatible with dBASE .dbf files. Our mailing list went right into the new application without even having to be converted!

And Now I Get Fancy...

First I breezed through the tutorial just to get a fully operational application, but now I have the time to dress it up and make it fancy. First I'll change my menus to 3D boxes for the menu selections, and change some of the colors here and there. Alpha FOUR makes it all so easy. Then I'll customize some of the data entry screens so they look just like the paper forms the employees are used to working with. I know — I'll call up Alpha's free Bulletin Board Service and get some tips from other Alpha FOUR users.

In the future, I'll use Alpha FOUR's "Documentation" program to print out a full report of my database design, complete with all the details. That way, someone else can pick up where I left off and further expand the system.

SAVE $450 With This Ad!
Special offer: $99 Upgrade from your existing Data Manager.

If you already have any database software, integrated package* or mail list manager, or if you are currently using your spreadsheet to manage data, you can upgrade to Alpha Four for just $99.

**Qualifying packages include programming databases (dBASE II, III and IV, Paradox, Clipper, Foxbase Fox Pro, Revelation, etc.), flat-file databases (Q&A, PFS:Professional File, Rapid File, etc.), integrated packages (Microsoft Works, PFS:First Choice, Lotus Works, etc.), and mailing list managers (FastPak Mail, etc.) or spreadsheets with databases (Lotus 1-2-3, Quattro Pro). Retail price $549.*

ALPHA SOFTWARE CORPORATION

Alpha FOUR

RY 3631 **Alpha FOUR UPGRADE 5¼"** **$99.00**
RY 3635 **Alpha FOUR UPGRADE 3½"** **$99.00**

Regular Tiger price $319. Hard disk. 360kb, MS-DOS 2.0 or above, 512kb RAM. Includes over 40,000 Zip Codes with corresponding cities and states — completely cross-referenced for easy fill-in.

Risk-free, 60-day money-back guarantee.

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Never Read a Manual Again!

FREE FEDERAL EXPRESS

On-Line, In-Depth Instructions for WordPerfect 5.0 & 5.1, and Lotus 1-2-3!

As the popularity of WordPerfect and Lotus' new releases sweep the industry, more users are attracted to their incredible power, design and functionality. But learning these programs can be some work. Now anyone can quickly master WordPerfect and Lotus 1-2-3 without spending days or even weeks with the manuals. Ko-Pilot is available from anywhere by just hitting a function key, then it takes over, outlining your options from a pull down menu. You won't have to memorize any complex commands or series of steps.

For WordPerfect 5.0 & 5.1.

WordPerfect has become the standard word processing software for businesses of all sizes. Now new employees, or users unfamiliar with WordPerfect can virtually teach themselves in just a matter of hours. Advanced users will find Ko-Pilot helpful in using features they never learned — or they didn't know existed. Columns, headers, footers, graphs and a host of other features are just a keystroke away. You'll progress faster, and learn more.

Ko-Pilot Provides Instruction.

Ko-Pilot isn't just a "skim the surface" look at WordPerfect and Lotus 1-2-3. It covers the entire scope — everything you need to know. In fact, it is a complete course that you take as you work. Even the most complex operations become simple tasks when you use Ko-Pilot to show you how.

NEW! Ko-Pilot for Lotus 1-2-3.

The brilliance of the electronic spreadsheet doesn't have to be intimidating. Ko-Pilot takes you by the hand and leads you through any operation with just a keystroke. Hit F1 and pull down menus allow you to perform @ functions, record and use macros, move ranges, set up your printer and dozens of other Lotus features that could take weeks to fully master. These fast, elegant software products are important new breakthroughs because they allow more people at more levels of expertise to use WordPerfect and Lotus 1-2-3 to become more productive, confident and satisfied using their computers.

INSIGHT RESOURCE INC.

KO-PILOT

RY 3340 For WordPerfect 5.0 & 5.1 5¼"	$89.95
RY 3345 For WordPerfect 5.0 & 5.1 3½"	$89.95
RY 3380 For Lotus 1-2-3 5¼"	$89.95
RY 3385 For Lotus 1-2-3 3½"	$89.95

System Requirements: IBM PC, XT, AT, PS/2. Wordperfect requires 640K; Lotus requires 512K. Lotus 1-2-3 Ver. 2.2 w/3.1 available 1st quarter '91.

Automatically Turn Ideas into Diagrams...

allCLEAR Translates Text into Pictures!

How do you convey to a client how projects flow in your company? How can you ensure new employees really understand the procedure for using a purchase order, or when to use express shipping? With allCLEAR, your thoughts are instantly expressed as pictures — accurate, presentation-quality tree and flowcharts. All created without any preplanning or drawing on your part.

A Milestone in Communication.

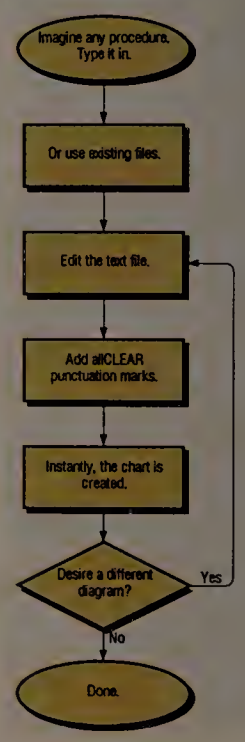
There is no other product we've seen that can help managers and others within organizations to clearly explain corporate policy, structure and procedures like allCLEAR. We've found allCLEAR extremely useful here at Tiger for helping with customer service problems and providing technical assistance. The fact is, this is a powerful tool for communicating precisely how to accomplish any procedure-based task.

Here's How allCLEAR Does It...

Using the built-in text editor, or your favorite word processor (or any text or Lotus 1-2-3 file) you give allCLEAR a plain English description of any organization or procedure you can imagine. With the addition of a few punctuation marks, allCLEAR now understands the underlying relationships. The result is clear, unmistakable — visual — communication. You'll control the consistency, approach and results of business activities. A great management tool, allCLEAR doesn't just automate a process; it visually defines how a process works — a tremendous advantage.

Once diagrams become so easy to create, things happen...

- Procedures, no matter how complex, can be conveyed — and understood — more quickly.
- Training time is reduced. So are the expensive errors unknowingly made by unsure employees. Even the newest employee can understand and convey what steps to take.
- Better understanding of company policies. Fewer calls on routine matters; less time spent explaining.



- Communication without pages of verbiage. Quicker to create, quicker to comprehend.
- Quicker consensus. When people can see the situation visually, they can reach agreement quicker, without the likelihood of misunderstanding.

Here's All You Do...

This diagram began by typing the sentences into our word processor. Then we told allCLEAR where to loop and pressed one key — the diagram was done!

Complex charts are no problem — allCLREAR can create even wall-size, multipage charts on any dot matrix, LaserJet or PostScript printer. Try allCLEAR risk-free today.

Clear Software, Inc.

allCLEAR

RY 1895 allCLEAR 5¼" & 3½"	$299.95

System Requirements: IBM XT, AT, PS/2 and compatibles; 640K memory; DOS 3.0 or later; hard disk; CGA, EGA, VGA, Hercules, or compatible; any dot-matrix, HP LaserJet, HP DeskJet, Canon, or PostScript printer.

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"Can I Afford the House?"

FREE FEDERAL EXPRESS

Instant Answers to Complex Financial Questions.

EDITOR'S NOTE:

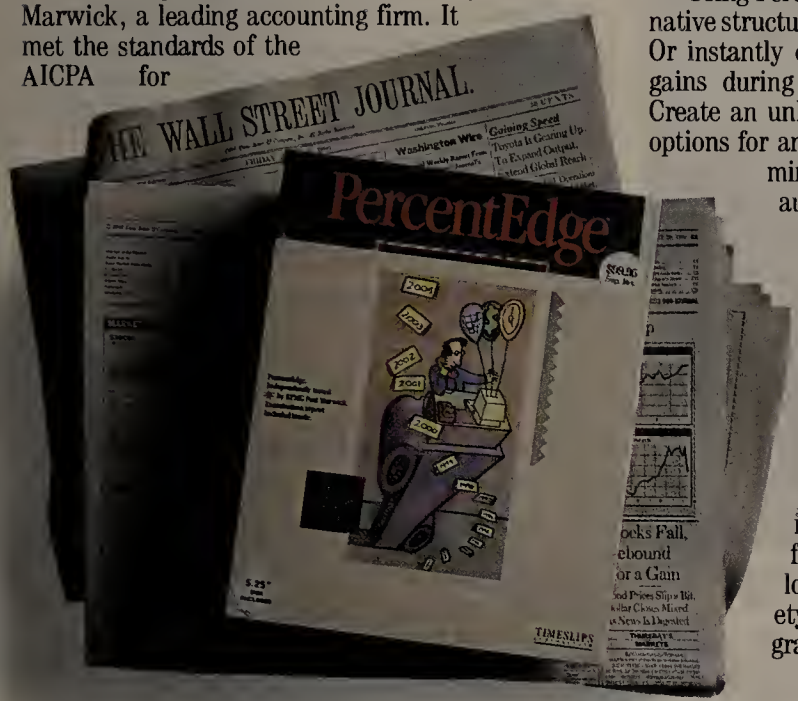
PercentEdge has become a popular title here at Tiger. Elegantly written and very easy to use to its fullest, PercentEdge provides another important software package for professionals and is very reasonably priced.

Its powerful capabilities and easy-to-use functions make it a handy tool for people who need fast answers to make good money decisions. Without diving headlong into a spreadsheet, just tap in a few numbers and PercentEdge can instantly give you what you need.

PercetEdge was recently examined by KPMG Peat Marwick, a leading accounting firm. It met the standards of the AICPA for use in the industry. If you deal with numbers, you need the fast, competent help of PercentEdge.

Keep reading, because this is a must-have item for real estate, legal and accounting professionals.

—Carl Fiorentino, President.



This speedy financial tool allows you to quickly enter information about anything from annuities to loan balances to amortization schedules — then, using a sleek interface, PercentEdge will calculate and present a custom analysis of any specific financial transaction.

Powerful Professional Tools.

Using PercentEdge, you can quickly develop alternative structured settlements to fit your client's needs. Or instantly calculate the present value of losses or gains during periods of fluctuating interest rates. Create an unlimited number of alternative financing options for any negotiated purchase. Great for determining the smartest way to finance a house, automobile — any investment.

Once you've got the numbers, you can crunch with flexibility and superior interactivity. Like calculating multiple balloon payments, unlimited "what-if" scenarios, and comparing several scenarios — simultaneously on screen.

Personal Finances...

PercentEdge can also be used as a personal finance tool. For instance, an individual can estimate the maximum affordable price for property, evaluate a car loan, compare financial benefits of a variety of investments, or design a savings program for a child's education.

PercentEdge is the only financial software capable of operating in two modes. Run PercentEdge as a RAM-resident program for "pop-up" convenience, or as a full application for extensive financial work.

Mortgages Can Be Tricky.

Now real estate professionals, as well as first-time buyers can — in seconds — calculate the maximum affordable price of a property. Just give PercentEdge the monthly budget, the interest rate, the life of the loan and the downpayment. Bang! You'll get the number. If there are special considerations such as multiple balloon payments or variable interest rates over the life of the loan, just enter it into the Mortgage Screen and PercentEdge instantly recalculates and gives you the revised values.

Present Values...

Questions about a pension plan, annuity or other time/value calculation? By leaving the appropriate boxes or cells blank on the Present Value Screen, and filling in the known data, you can compute rates, dollar amounts, and dates.

Amortization Schedules...

The Amortization Screen shows you how a loan will be paid back over time. These calculations can be helpful in determining figures for tax returns and financial statements.

TIMESLIPS CORPORATION

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RY 1240 PercentEdge 5¼"	$99.00
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IBM PC, XT, AT, PS/2 or compatibles with 320K.

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A Complete Atlas On Disk.

This innovative program brings the entire globe to your computer screen, combining a complete atlas, almanac and world fact book into one exciting, informative package. You'll have instant access to over 240 fully detailed, EGA/VGA color maps along with a vast database of useful international information. You'll explore the geography, people, government and economy of any nation on Earth, including such details as climates, coastlines, population, language, labor force statistics, military strength, inflation, industry, highways and waterways, and more.

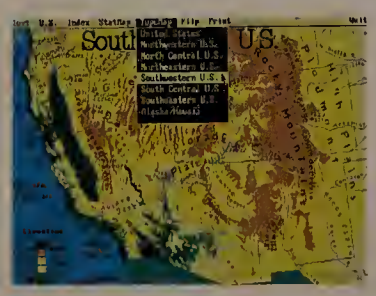
Indispensible Guide and Reference Tool.

World Atlas is an ideal reference tool for travelers, educators, business people, librarians and students. It's an indispensible guide that brings together all types of important information that would take months to research and assemble. With just a couple of keystrokes any bit of data is on your screen.

World Atlas includes a special travel section, containing information of particular interest to travelers, such as monetary conversion rates, seasonal facts and language.

World Atlas is very easy to use. You don't need to learn lengthy commands. Just point to a country on any index map, click — the desired map appears instantly. From there, simply select specific information and statistical maps for individual countries from sleek, drop-down menus. You can easily print customized reports mixing maps and text — even export maps to desktop publishing programs for use in your newsletters, reports and other publications.

World Atlas contains three types of maps: thematic, reference and regional relief maps. These maps provide a wealth of knowledge about any area you'd like to explore. There's also volumes of comparative data on every country in the world in five subject areas: geography, people, government, economy, trade, and communications. And all information contained in World Atlas is obtained from world organizations and several U.S. Government sources for up-to-date accuracy.



Maps like the one you see here are highly detailed and contain information on travel, climate, geography and population. Both World Atlas and USA Atlas give you a wealth of information. Great for students and businessmen.

NEW! U.S. ATLAS

U.S. Atlas brings the entire North American continent to your computer screen! Simply click on a state or county, or even a city, to explore such information as: population, average temperatures, and local time.

INTRODUCING THE ALL-NEW ATLAS PACK

Both of these incredible titles in one package. This complete Atlas encompasses the information contained in hundreds of books. Just $79.95 — a great value!

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IBM PC or compatibles with 640K. Hard disk; EGA or VGA graphics card color monitor; Microsoft mouse or compatible.

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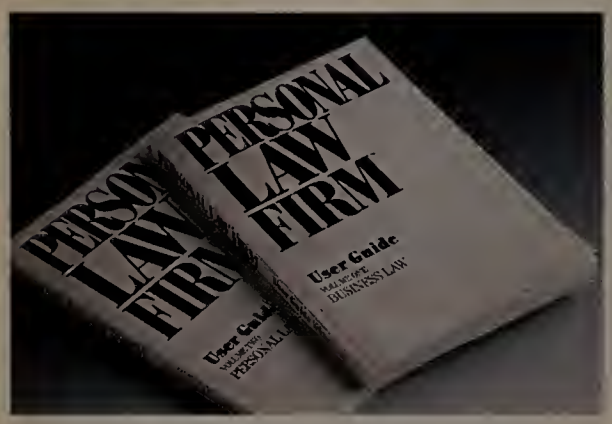
Create 30 Types of Legal Documents.

Binding Legal Documents To Protect Your Family and Property.

It's a nightmare you hope never happens. An untimely accident or illness leaves your family without a breadwinner — and without a will. In such cases, the state immediately moves in to divide your estate as it sees fit, with no regard for your wishes. Your survivors will face a long, uphill battle to reclaim what a will would have granted them instantly upon your death, without question.

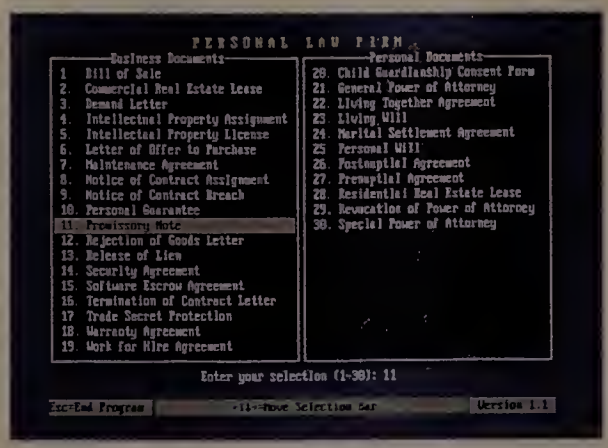
And yet, 3 out of 4 people every year die without one.



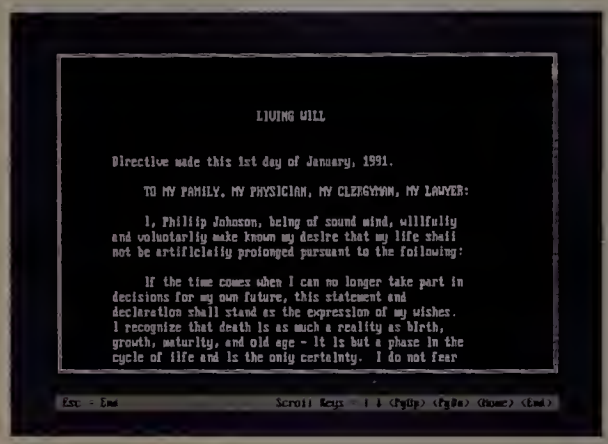
Extensive background information in "plain English."

Perhaps you feel that in the event of an illness or accident that leaves you completely dependent on life support, it should not be prolonged. You can create a Living Will to state in writing your wishes under specific circumstances. This Living Will can be created with Personal Law Firm in just a few minutes.

Part of your responsibility to your family is to provide for their security after you're gone. It's never too soon to start preparing a will, and with new Personal Law Firm, you can carefully prepare a legally binding will right now! Just answer a series of questions and the document is "written" using the system's intelligence, ready to sign. Just a few minutes, that's all it takes.



The Personal Law Firm Main Menu.



How about this scene. You sell your car privately and tell the buyer jokingly that the car will probably run forever. Two years later, he has a problem and sues you claiming that you guaranteed the car. Sound crazy? Our courts are jammed with cases where misunderstandings have exploded into litigation. A Bill of Sale should always be written and signed in transactions like this. Or what if you're out for the evening, leaving your children in the care of a babysitter and there's an accident that requires immediate medical attention. You can't be reached and the hospital won't treat the injured child without parental consent. Just a brief session with Personal Law Firm can assign a temporary guardian (babysitter, neighbor) able to give legal consent in your absence.

What Would You Do?

Suppose you've ordered a piece of merchandise and upon its arrival, discovered that it was damaged. Without prompt, *written* notification, in the form of a Rejection of Goods Letter, the manufacturer may not be required to accept it for return.

Or what happens in a situation where your pool man accidentally damages your pump and refuses to pay for the repairs? A written Maintenance Agreement clearly handles such occurrences.

Suppose a former employee leaves your company to join a competitor and reveals to them product information, market research or other proprietary information? Suppose the tenants who are renting your little bungalo on the beach decide to invite the entire State of Rhode Island to spend February with them?

Have you ever hired a carpenter to work on your house? If you don't clearly define the relationship, you could be responsible for the withholding taxes on his income. A Work for Hire Agreement should accompany every such transaction. If you lease (or sublease) office or commercial space to a tenant, you should have the protection of a formal lease, agreed to in advance by both parties, and covering topics from services provided to late fees for rent payments, the type of business that can be conducted and many other issues. Personal Law Firm creates commercial real estate leases as well as residential leases.

If you've ever launched a startup business, you know the requirements lenders establish for borrowing capital. They'll ask for a Personal Guarantee from a principal to back the loan. Using Personal Law Firm, you can create a document with the terms you created, rather than one prepared by the lender.

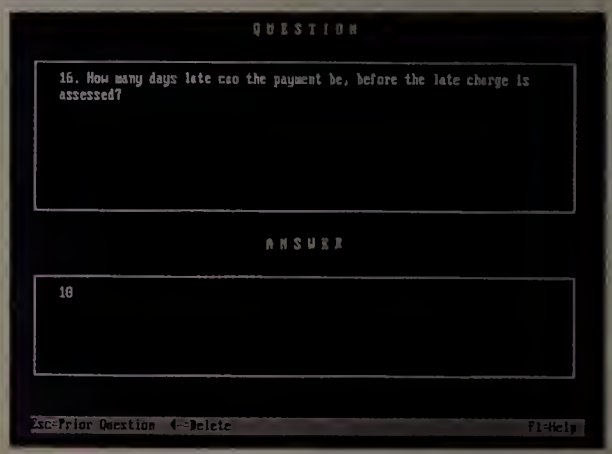
The law is very specific when it comes to matters like these. Get the agreement in writing. Personal Law Firm requires just a few minutes to produce written agreements to cover these situations and many more.

If It Isn't In Writing...

...It simply isn't binding. And it's never easy to predict where you'll run into a legal situation that can get out of control.

Personal Law Firm Includes:

Last Will and Testament.
Living Will.
Residential Lease.
Power of Attorney.
Living Together Agreements.
Prenuptial Agreements.
Postnuptial Agreements.
Marital Settlement Agreements.
Child Guardianship Consent Form.
Commercial Real Estate Lease.
Work for Hire Agreement.
Maintenance Agreement.
Personal Guarantee.
Release of Lien.
Promissory Note.
Trade Secret Protection.
License of Intellectual Property.
Assignment of Intellectual Property.
Bill of Sale.



Instantly create Personal Guarantees with Personal Law Firm.

Warranty Agreement.
Software Escrow Agreement.
Letter of Offer to Purchase.
Demand Letter.
Rejection of Goods Letter.
Termination of Contract.
Notice of Contract Breach.
Notice of Contract Assignment.

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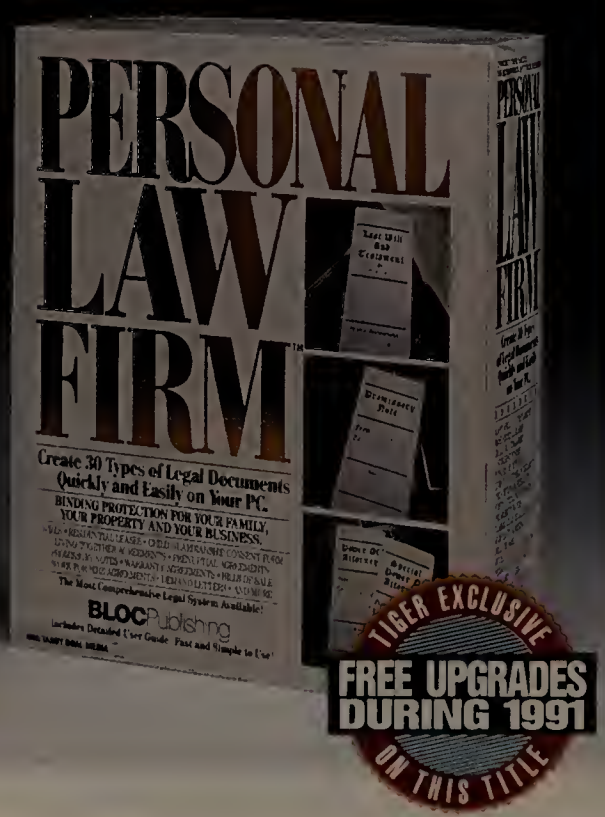
All-New Comprehensive Legal Protection. Now Includes Living Will!



PERSONAL LAW FIRM

RY 1150 Law Firm 5¼" & 3½" **$99.95**

System Requirements: IBM PC, XT, AT, PS/2 and compatibles with 256K, one floppy, a hard disk and DOS 2.1 or greater. It requires an 80-character display (color or monochrome) and will support virtually any printer.

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Beat Postal Rate Increases!

Maximize the Performance and Minimize the Cost of Everything You Mail.

With a sharp increase in postal rates for several categories of mailed materials coming in early 1991, FastPak Mail can save you money the very first time you use it. FastPak Mail automatically eliminates duplicates from your lists (nothing does that right out of the box, if at all), quickly handles zip-code sorting (a real money-saver), imports names from existing databases (like dBASE, for example) and allows you to perform sophisticated (and very selective) mail-merge with no problem at all. FastPak Mail allows you to print labels of virtually any shape or size, print customized envelopes, post cards, rotary index cards, clear labels and more. And it can handle up to 64,000 names!

Easy to Learn and Use.

FastPak Mail is great for beginners, yet contains all the power and functionality that the advanced users demands. And when you consider the time and money that FastPak Mail save you — from the one-man operation to the Fortune 500 vice president — it's one software title you'll use often!

More than just a list manager, smarter that just a label printing program, FastPak Mail is the complete mail and customer list tracking system, designed to keep your mailings cost-effective and timely.

Direct Mail Superstar.

FastPak Mail was designed by direct mail pros. It contains all the power and functionality of systems in use at large direct mail houses — at a fraction of the cost. Without the tools that FastPak Mail puts at your fingertips, you'll spend a lot more than you need to (and substantially reduce profits) on your mailings.

Ready To Print Lists and Labels.

FastPak Mail will support virtually any label made — by any manufacturer. Choose from pre-defined formats available from the menu, or quickly create your own format to fit your particular needs.

Print labels 1, 2, 3 and 4 across in dozens of sizes and shapes. FastPak Mail supports all popular continuous feed label brands.

Print all of this and more... labels (any configuration), return address labels, envelopes, rotary index cards, clear adhesive labels, file folder labels, shipping labels, packing labels and dozens more — anything you can put a name and address on. Just select the type you need from the list of built-in formats and they're done!

Easily Merge Information.

FastPak Mail will allow you to easily merge names and addresses into the body of any letter. You can quickly produce custom mailings to selected lists — even merge information into the body of a letter.

And if you have existing lists stored in other applications, they can be quickly and accurately converted for use in FastPak Mail for powerful merges with easy set-up.

Sorting, Printing and Preparation.

FastPak Mail simplifies bulk mail by streamlining the entire process. It is the only product that can sort to virtually any specification, and all sorting is done to achieve the least possible cost.

Addresses Express Shipping, Airbills, UPS C.O.D. Labels.

You can use FastPak Mail to finish up mailing chores by addressing Federal Express airbills, U.S. Post Office Express Mail airbills — even UPS C.O.D. labels. The pre-designed templates for these forms are available from the menu and will support virtually any printer.

FastPak Mail will also print shipping labels using a pre-defined format — or create your own.

Laser Printing Capabilities.

Now everything you mail can be crisp and authoritative, taking full advantage of laser technology's broad range of fonts, sizes and formats. FastPak Mail is able to support internal printer fonts as well as downloaded fonts — even print sideways! And FastPak Mail includes an innovative print spooling feature.

Give Envelopes a Clean, Professional Look.

Produce attractive envelopes that are sure to be opened! FastPak Mail contains built-in envelope printing support for many printers.

Simplified Bulk Mail.

Save money on bulk mailings with built-in features like 9, 5, or 3 digit zip code sorting and automatic duplication checking. Organizing lists is easy — FastPak Mail can sort lists by any criteria — names, addresses, companies, state, zip codes — or even any two!

Works With All Leading Word Processors.

Import and export documents easily to and from leading word processors like WordPerfect, Wordstar, Microsoft Word, Multimate or spreadsheet programs like Lotus 1-2-3, Symphony and Excel — as well as database programs like dBASE via ASCII files.

FastPak Mail lets you stay on top of communications like: prospect mailings, newsletters, follow-up mailings — and hundreds more.

What FastPak Mail Does...

File Handling

- Organize name and address files
- Sort by name for easy look-up
- Sort by zip codes to save money
- Eliminates duplicates
- Sort by company for customer lists
- Code records for easy selection
- View text files on-screen
- Move names from file to file
- Access all functions from menu
- Enter names fast
- Correct/modify records easily
- Easily delete unwanted names
- 'N'th name selection for test mailings
- Gender or country coding

Unlimited Applications

- Make sequenced mailings
- Maintain customer/prospect lists
- Organize business card lists
- Create telemarketing files
- Do prospect mailings
- Address newsletters
- Sell by direct mail
- Simplify bulk mailings
- Maintain subscriber lists
- Respond to literature requests
- Track & follow-up on sales leads
- Maintain membership lists
- Keep up-to-date customer lists
- Keep employee lists
- Organize routing lists

Mail-Merge Capabilities

- Combine multiple mailing lists
- Create ASCII files
- Export mail files to ASCII
- Use most word processors

Data Entry

- Create custom label formats
- Use built-in label formats
- Repeat fields without retyping

Printing Versatility

- Any type of mailing label
- Form letters
- Rotary index cards
- Return address labels
- Envelopes
- Address W-2 forms
- Address 1099 forms
- Packing lists
- Shipping labels
- Invoices
- UPS C.O.D. labels
- Federal Express airbills
- File folder labels
- Inventory labels
- Resumes
- Credit letters
- Collection letters
- Post cards
- Shipping manifests
- Notices
- Bills of lading
- Inter-office memos
- Pendaflex labels
- Distribution lists
- Statements
- 3×5 index cards
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- Print single letters
- Address any form
- Print multiple labels of any name
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- Laser printer support
- Single address "Quick Print"

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HIGHLY RECOMMENDED

When Accounting Today (May 1990) asked accountants which accounting software package they recommended to their small business clients, an overwhelming 29% said they recommend Peachtree Accounting– that's almost double the next largest competitor.

Reseller Management (March 14, 1990) asked resellers which accounting package they recommend and Peachtree came out on top again with 25% of resellers recommending it.

But accountants and resellers aren't the only ones giving Peachtree rave reviews·

"If you could find a definition for Peachtree in the dictionary, it might be 'value for your money.'"–PC Magazine 4/10/90

"It is, I believe, the best accounting package available for the price."–E.J. Bosmeny, CPA, Naperville, IL

"Complete III rivals packages costing 10 times as much."–PC Resource, July 1990

If there's one thing people agree on, it's what a great value Peachtree's Double Bonus Bundle is. That's because it includes two first-rate software packages for one low price–Peachtree Complete III, a full-featured accounting system, and Peachtree Data Query III, a reporting and analysis tool.

Peachtree Complete III includes nine high-powered modules to meet all your business accounting needs.

- General Ledger
- Accounts Payable
- Accounts Receivable
- Payroll
- Inventory
- Invoicing
- Purchase Order
- Fixed Assets
- Job Cost

Peachtree Data Query III gives you custom access to the vital accounting data in your Peachtree Complete III files. Choose from PDQ's predefined reports, customize your own reports (and store the formats for future use), even export data to popular applications like Lotus 1-2-3® and dBASE®, with no risk to your files, and no re-keying of data.

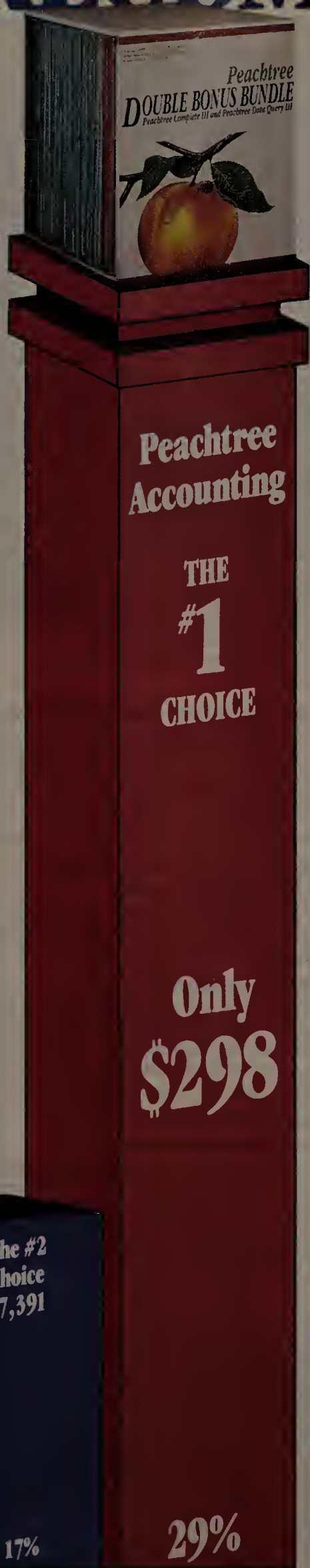
And, Peachtree is the one accounting system you won't outgrow. Install the functions your company needs now and add modules, departments or even companies to the system as your business grows.

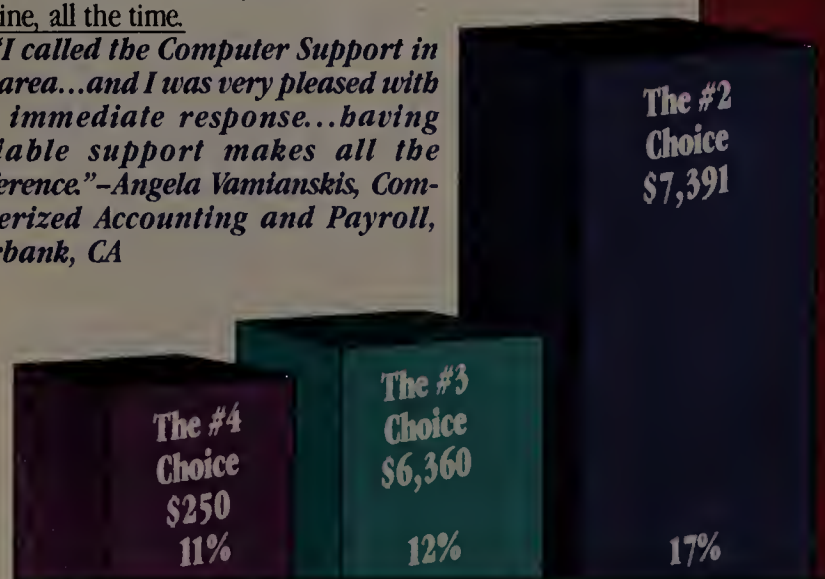
"...It is, beyond a shadow of a doubt, the best, easiest to use, most helpful program I've ever had to review."–C. McQuaid, McQuaid & Holland, Inc., Accountants, Geneva, AL

"Installation is easy, data entry is fast...a joy to use."–PC Resource, July 1990

With Peachtree, you don't have to give up ease of use to get the power and performance you need. The Double Bonus Bundle comes with on-line tutorials for each module and thorough documentation–an Accounting Primer, a quick-start Installation Guide, and a complete reference library–so you can get up and running quickly. Errors are handled with plain English messages and suggestions. Context-sensitive HELP is on-line, all the time.

"I called the Computer Support in my area...and I was very pleased with the immediate response...having reliable support makes all the difference."–Angela Vamianskis, Computerized Accounting and Payroll, Burbank, CA





More professional accountants recommend Peachtree!

At Peachtree, we make technical support convenient for you with Authorized Support Centers in over 60 cities across the country and directly from Peachtree (support charges based on the length of the call on your credit card). And we stand behind our products with a 30-day money-back guarantee when you buy directly from Peachtree. If for any reason you're not satisfied, just return the package within 30 days for a prompt refund (less a $25 restocking fee).

"Peachtree Complete III is one of the most full-featured accounting systems in its class."–INFOWORLD February 2, 1990

Features

General Ledger
- Unlimited accounts
- Comparative financial statements–present or back to 2 years
- Prior period adjustments

Accounts Payable
- Partial payment of invoices
- Prints checks
- Prints miscellaneous 1099's

Accounts Receivable & Invoicing
- Maintains open item or balance forward customers
- Unlimited transactional detail
- "Ship to" address file

Purchase Orders
- Updates purchase orders and inventory
- Generate A/P invoices from purchase order

Job Cost
- Tracks profitability on a job-by-job basis

Payroll
- Unlimited number of employees
- Accrues sick and vacation time
- Prints checks, W-2's calculates Federal and State payroll taxes

Inventory
- Supports LIFO, FIFO, Specific Unit, standard and average costing methods
- Unlimited inventory items
- Serial number tracking

Fixed Assets
- Handles 13,000 assets and 13 methods of depreciation

PDQ III
- Modify pre-defined reports
- Create your own reports
- Present data in line or bar graphs
- Transfer information to dBASE III® and Lotus 1-2-3®

Hardware Specifications. Requires PC/MS-DOS version 3.0 or higher with 640K of memory and a hard disk. For use with IBM PC, PC XT, PC AT, Personal System/2 and compatibles 3½" media optionally available. Not copy protected. All product prices represent complete accounting systems with modules comparable to Peachtree Double Bonus Bundle.

Lotus 1-2-3 is a registered trademark of Lotus Development Corporation. dBASE is a registered trademark of Ashton-Tate Corporation. IBM is a registered trademark and Personal System/2 is a trademark of International Business Machines.

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Order Peachtree's Double Bonus Bundle NOW! Find out what over 350,000 satisfied Peachtree users already know–why so many people highly recommend Peachtree.

"...It's the only application I recommend. The package is superb..."–Marc Barlow, Executive Vice President, AdMedia, Largo, FL

PCW

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CONSUMER WATCH

Advice and information for the computer consumer

You can get great deals by buying mail order, but know who you're buying from before placing your order.

Roberta Furger

Buying by Mail

Peter Duke and Richard Whitsitt don't know each other, but over the last few months they've suffered through the same painful learning experience. They each paid thousands of dollars for computers that never materialized to mail-order firms that have since disappeared.

Unfortunately, their experiences aren't unique. They are only two of dozens of users we've heard from over the past several months who've been left poorer but wiser as many mail-order firms stumble during these rough economic times.

Most consumers don't think about the financial health of a company before placing an order—whether it's for living room furniture or PC hardware and software. We shop around for the best price and service and then plunk down the money, fully expecting to receive product in return.

But, as Duke and Whitsitt can attest, this is not always the case.

Whitsitt, a CPA from Panama City, Florida, paid by check for a 386SX from Express Micro Mart of West Bloomfield, Michigan. His check was cashed, but the system never arrived. After repeated attempts to get his money refunded, Whitsitt opted for an ingenious solution: Taking a chance, he ordered a second system and charged it to a credit card. When the system arrived, he requested that the credit card company reverse the charges, documenting that he'd already paid for an equivalent system. The card company complied.

Duke wasn't quite as fortunate. The Littleton, Colorado, resident paid $4390 to RP Systems of Oak Brook, Illinois, for a computer that was never shipped. He has initiated legal action against the firm but has yet to get his money back.

Every industry is feeling the effects of the recession, and PC companies are no exception. Even many large, well-capitalized firms are reporting lower earnings and scaling back projections for 1991. For a lot of mail-order firms, leaner times can prove even more damaging, since many operate on slim margins. When a mail-order firm is in poor health, it may mean that orders aren't shipped when promised, repairs go unmade, calls go unanswered.

Unfortunately, it's often quite difficult to determine the financial status of mail-order companies before doing business with them. (The big, public companies such as Dell Computer and Northgate Systems are notable exceptions to this rule, since they are required by law to publish detailed financial statements.)

Mail-order shopping doesn't have to be a shot in the dark, however. Over the years, *PC World* has offered a variety of suggestions for safeguarding your rights—and protecting your pocketbook. But the letters we've been getting from users prove that the message bears repeating.

Mail-order shopping doesn't have to be a shot in the dark.

So, before picking up the phone and ordering a product, review the following checklist. You might want to clip it out and save it for future use.

Shopper's Survival Guide

Watch for signs of financial trouble.

- Sudden cash-payment requirement. We've heard of several incidents in which firms have started requiring payment up front to increase cash flow. Such changes in policy should send up a red flag.
- Abrupt change in advertising practices. A shift in advertising strategy doesn't necessarily mean financial trouble, but proceed with caution if ads for a firm that's been advertising heavily in a publication suddenly disappear.
- Toll-free lines get disconnected. A company's 800 numbers are one of the first things to go when a firm runs into financial trouble.

Know who you're buying from.

- Find companies that have been in business at least a year and a half.

(continues)

ANTHONY RUSSO

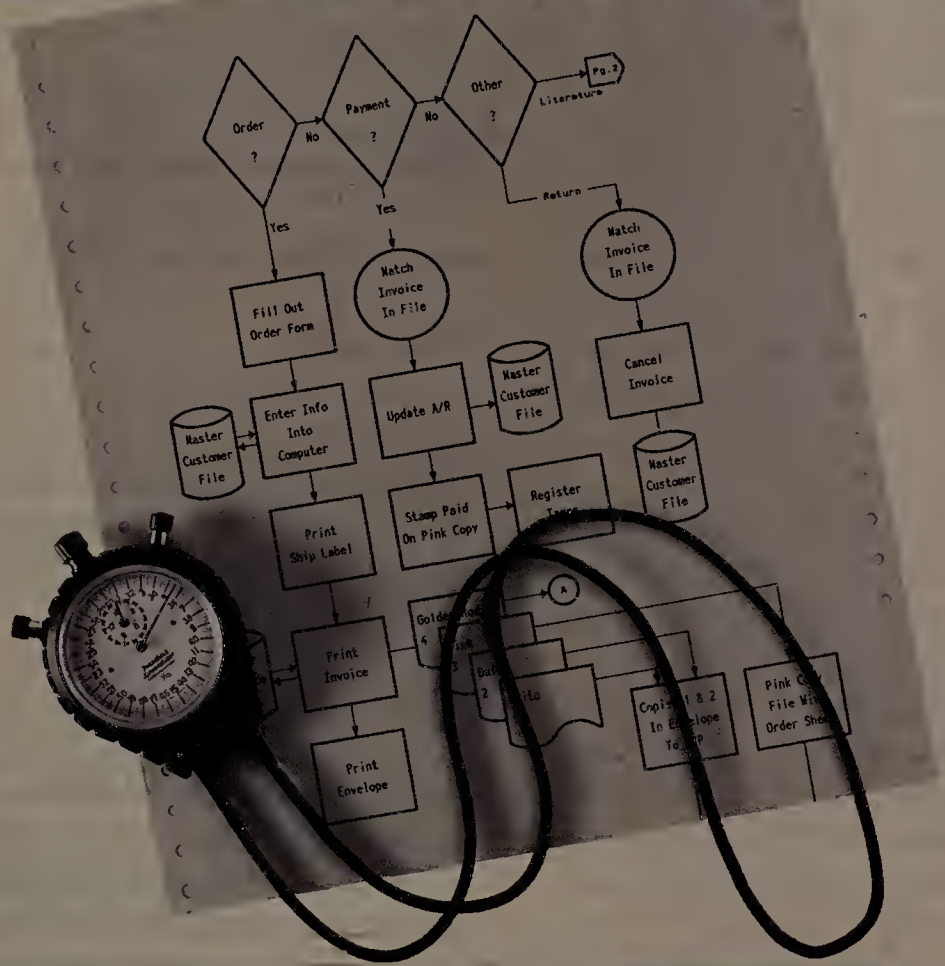
- Get recommendations from your friends and associates.
- Call the local Better Business Bureau and the U.S. postal inspector's and attorney general's offices about prior complaints.

Protect yourself against the potential for future problems.

- Pay only by credit card. Paying by check or money order leaves you with little recourse (short of legal action) if the product doesn't arrive or arrives damaged.
- Find out when your credit card will be billed. You should not be charged until the product is shipped.
- Exercise your credit card rights (see *Consumer Watch*, May 1990). Notify your credit card company immediately if you are charged for an item you have not received or if you receive an incorrect or damaged product.
- Buy only from firms offering a 30-

(continues)

BY HAND. OR BY NOON.



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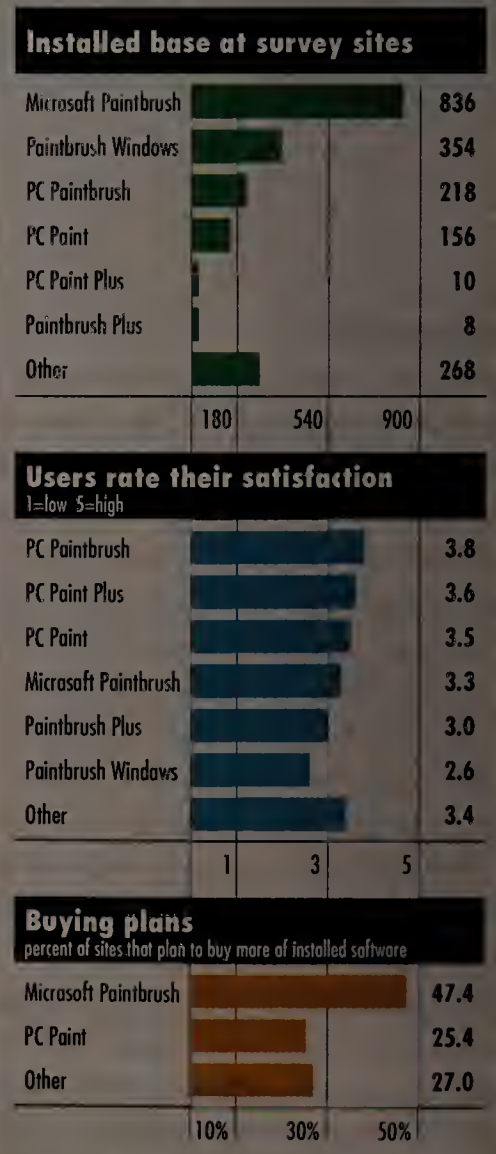
RATE YOUR SATISFACTION: PC Paint Programs

As in previous user surveys, *Microsoft Paintbrush* continues to boast the largest installed base among users of PC paint programs. Z-Soft's trio of paint programs—*PC Paintbrush, Paintbrush Plus,* and *Paintbrush Windows*—is also popular among PC users, with the *Windows 3.0* version the most widely used of the three. Mouse Systems' *PC Paint* doesn't have as many users as the Z-Soft or Microsoft products but rates third in user satisfaction and second in the plan-to-buy category.



Source: International Data Corporation. From a survey of 175 large organizations, each with at least 50 PCs. (Percents don't add up to 100 due to rounding.)

Lower your budget not your expectations.

Before you run out and spend five or six thousand dollars for a 386SX notebook PC, we seriously suggest you take a close look at Samsung.

We've just introduced the NoteMaster™ 386S/16. It has the features of a Compaq notebook PC for about half the price.

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	Samsung NoteMaster 386S/16	*Compaq LTE 386/20*
Processor	*16MHz 386SX*	*20MHz 386SX*
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Display	*VGA Sidelit CCFT* *Paper White VGA LCD* *256KB Video RAM* *64 grey shades support*	*VGA Edgelit LCD* *16 grey shades support*
Keyboard	*Standard AT-compatible* *3mm key travel depth*	*Enhanced keyboard* *2.5mm key travel depth*
Memory	*1MB expandable to 5MB*	*2 MB expandable to 10MB*
Software Incl.	*Laplink III* *MS-DOS* *Windows 3.0*	*Not available*
Support	*Toll-free 800 number* *On-line modem support*	*Not available*
Price	*20MB - $3999* *40MB - $4499*	*30MB - $6499* *60MB - $6999*

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day money-back guarantee. Get the details in writing so you know when the 30-day trial period starts and stops and whether you'll be responsible for restocking fees if you exercise the guarantee.

- Document all conversations. Keep detailed records of products ordered, noting who you spoke with, the agreed price, the method of delivery, and the expected delivery date.

SHOP TALK

When Is a Coupon Out of Date?

I purchased *Excel* on July 21, 1990, and in the box was a $9.95 offer for *Q+E* from Pioneer Software. However, according to the coupon, the offer had expired on June 30. I called Microsoft on its toll-free number and was told I would have to call customer service (at my cost), which I did. Customer service told me that the offer had expired, but that I could call Pioneer Software (again at my cost), which then told me that the offer was good only through Microsoft.

I again called Microsoft and was told it would offer the same premium in the future, but for now if I wanted *Q+E* I could buy it for $149.95.

I feel that the offer should be extended since it expired while the program was still in Microsoft's warehouse. I didn't even purchase *Excel* until after the expiration date.

Dean S. Adolphe
Vancouver, Washington

Editor's note: Apparently, Microsoft agrees. After a brief mix-up in customer service, orders are now being filled for anyone who purchased a copy of Excel *with the* Q+E *coupon enclosed.* Excel *users planning to upgrade to version 3.0 needn't bother, though, since the product is now bundled with the spreadsheet, rather than sold as an add-on.*

"No Charge—It's on Us"

For years we have used—without incident—Bernoulli 20MB cartridges in the internal Bernoulli drives of two of my law office's computers. Then one day, two cartridges suddenly could not be accessed. (We learned later that they suffered an "electrostatic encounter.") The cartridges' data was critical.

We shipped the cartridges to the manufacturer, Iomega Corporation, in Roy, Utah, hoping that something could be salvaged. Within two days, both cartridges were repaired and all of the data was saved. When the technician phoned to give me the good news, I asked him to include our bill with the shipment.

The response? No charge! And the cartridges were returned to our office by Federal Express—prepaid.

You can bet that Iomega will have me as a lifetime customer.

David T. Griffith, Jr.
Lake Arrowhead, California

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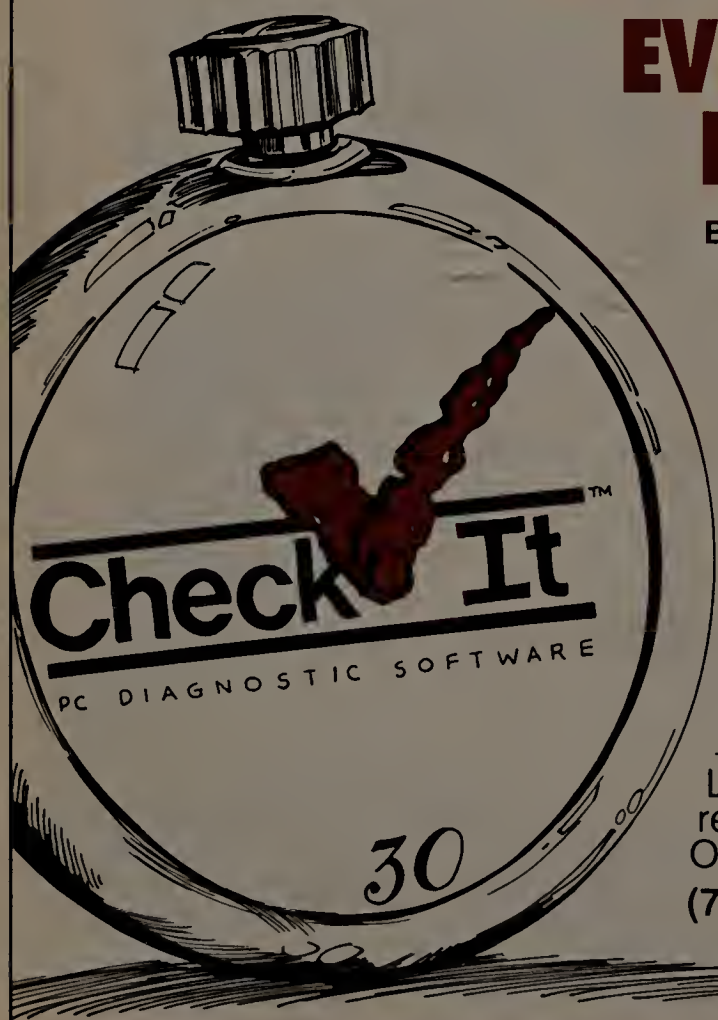

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Take a minute to run Check✔It the next time you have a PC problem. Then you'll know the answer to these key questions: Should you back it up, pack it up, and send it out for repair? Should you fix a hardware problem yourself? Or, should you concentrate on the software and configuration problems that you can correct?

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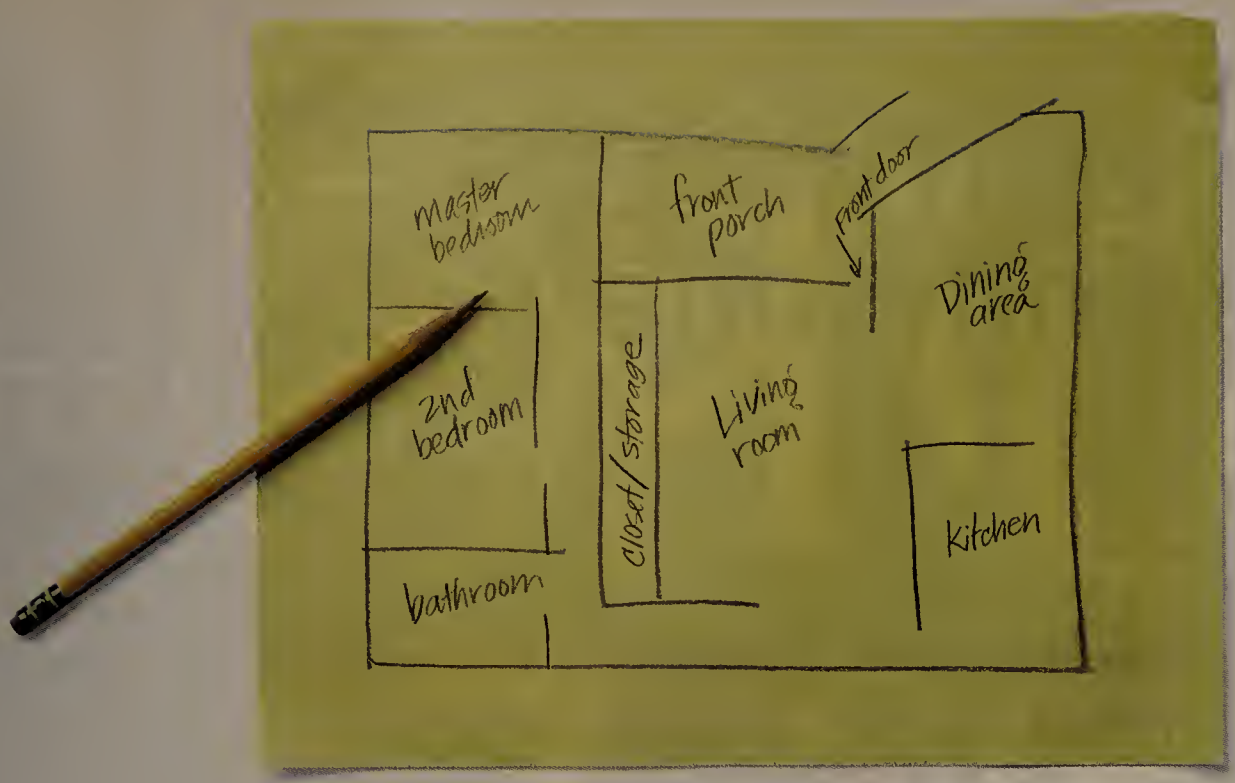
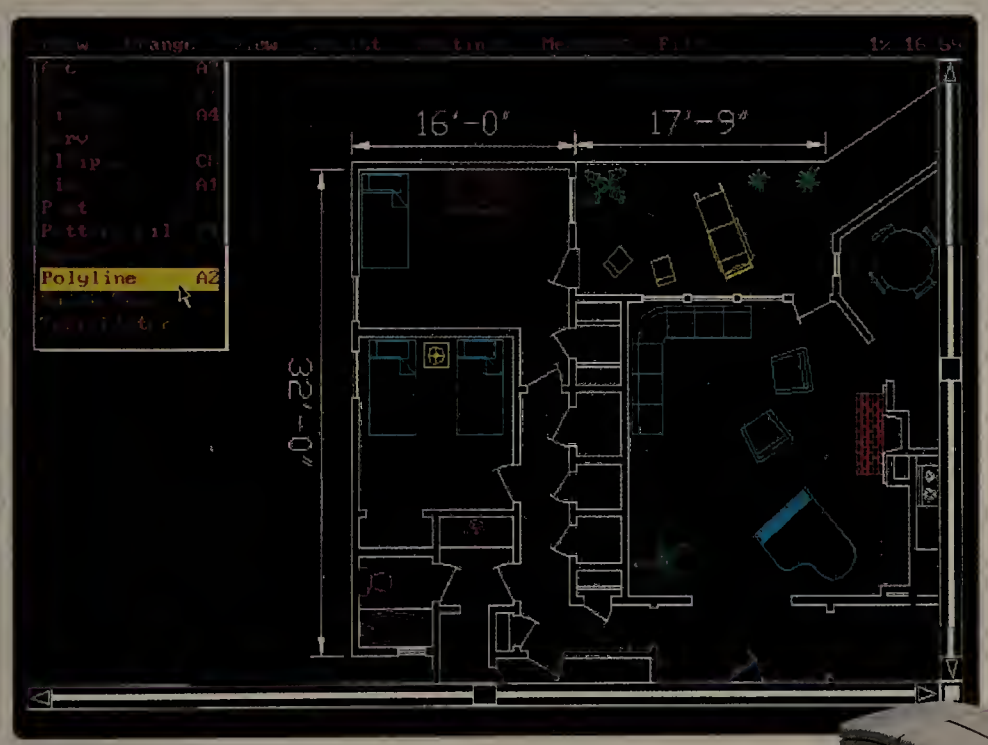


Sketch.



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A Not-So-Easy Upgrade

I took my *1-2-3* disk to Soft Warehouse and purchased Borland's *Quattro Pro 2.0* competitive upgrade for $99.95 plus tax. Upon installing the program, I discovered that I had version 1.1, not 2.0 as advertised—the version number was not marked on the box.

At first, Soft Warehouse refused to take version 1.1 back and give me a rain check as I requested. Finally, the sales representative agreed to take back version 1.1, give me a rain check for version 2.0 at $99.95, and refund the money I had spent.

At the checkout counter, I got my money refunded but did not receive my *1-2-3* disk back. I was also not allowed to leave the store with a copy of the rain check. I anticipated a problem getting Soft Warehouse to honor their promise to sell me the *Quattro Pro 2.0* upgrade without my *1-2-3* disk or my rain check, so I wrote to Borland and requested assistance.

Borland didn't just help—they sent me a free copy of *Quattro Pro 2.0*.

Praise be to Borland, and a pox on Soft Warehouse.

Lance Doyle
San Diego, California

The Cost of Damaged Goods

After reading *PC World*'s review of scalable-font laser printers in the September 1990 issue ["Fonts Unlimited: Seven Smart Lasers for Under $3000"], I ordered a Texas Instruments MicroLaser PS17 from Swan Technologies. I picked Swan because the company has a good reputation for customer satisfaction.

I received the printer promptly, but it was defective. I called Swan about the problem, and they gave me a return merchandise authorization (RMA) number and contacted UPS to pick up the equipment. I also ordered another MicroLaser, which is working fine. I attached a note to the defective equipment stating that I wanted the credit applied to my MasterCard account, and I

(continues)

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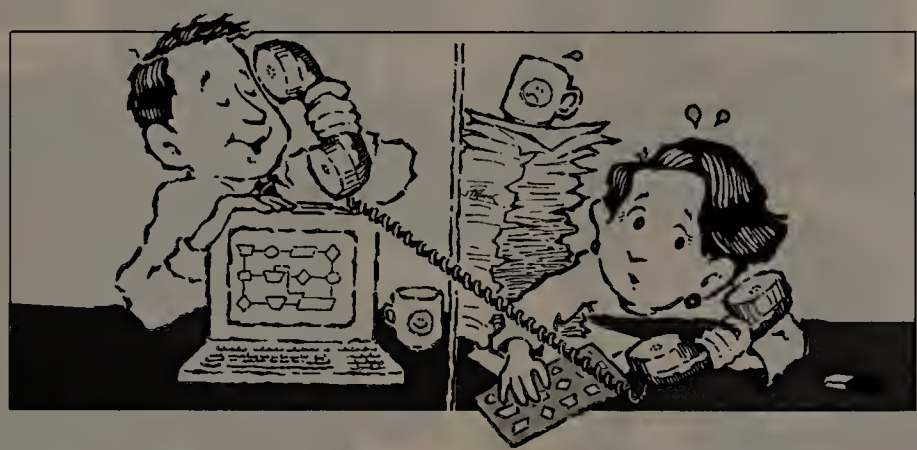

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thought everything was taken care of —until I received my credit card statement.

There was no credit on the statement for the TI printer. Because of this, my account was not paid in full by the due date and I was levied a $46.66 finance charge, which will continue to accumulate until my MasterCard account is paid in full.

I called Swan to find out what happened and was told that the RMA number was only for credit against my account with Swan, not my credit card. I was told they would put the credit through to my MasterCard account immediately, but that they would not provide any compensation for finance charges I had to pay because of their mistake.

Because of the defective product and Swan's mishandling of the credit, the printer has cost me an additional $125 ($75 in finance charges and $50 freight for the second printer).

Bruce Galvin
Seattle, Washington

Editor's note: Swan Technologies has credited Mr. Galvin's account for the full price of the printer, plus the $75 in finance charges. "Although it isn't our standard practice to refund such fees, we felt we could help the customer by doing this," explains Amy S. Burd, customer service manager for Swan Technologies.

She adds that the company will not refund the shipping charges. Had Mr. Galvin waited for the original printer to be repaired rather than ordering a new one, Swan would have paid to ship it back to him.

Think you've gotten a raw deal? Send the details to Consumer Watch, PC World, *501 Second St. #600, San Francisco, CA 94107; MCI Mail PC World Editorial; CompuServe 74055,412; or 415/442-1891 (fax). We'll investigate your complaint and publish letters with the broadest interest.*

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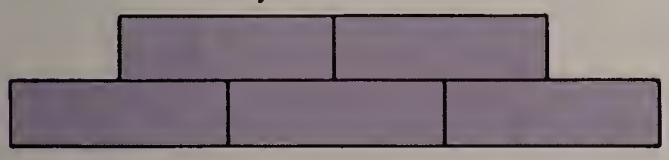

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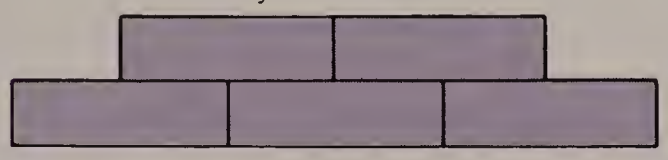

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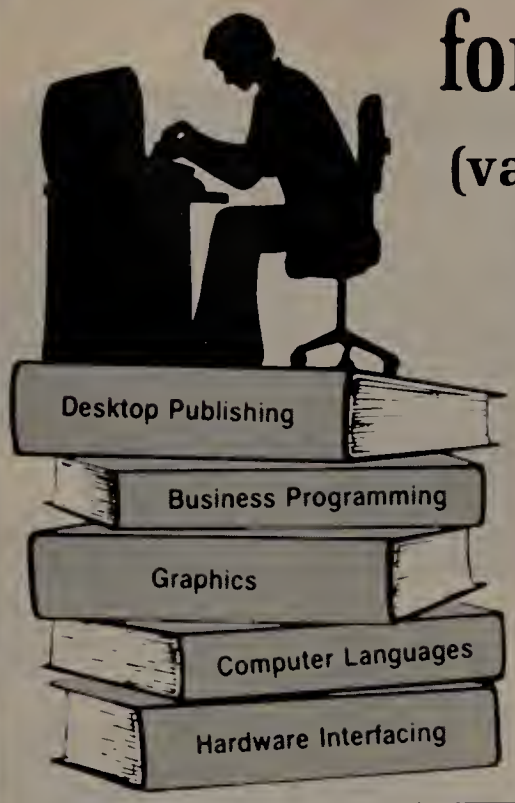

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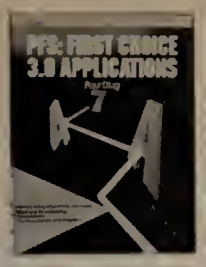

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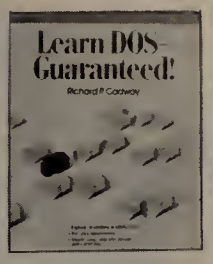

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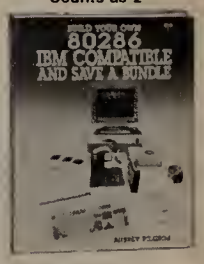

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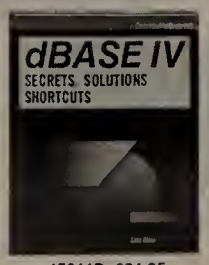

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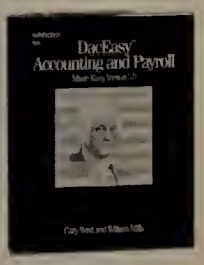

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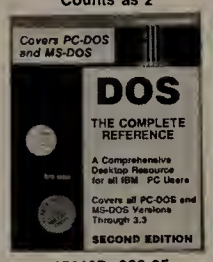

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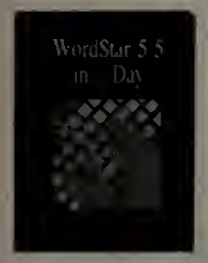

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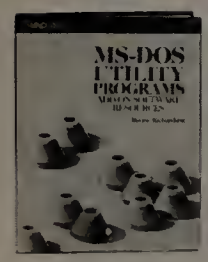

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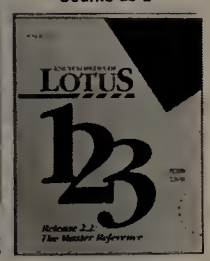

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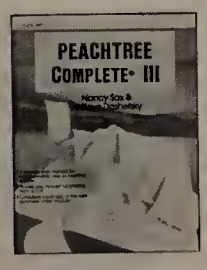

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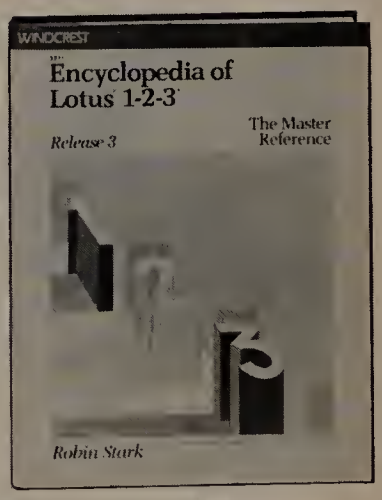

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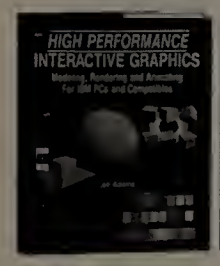

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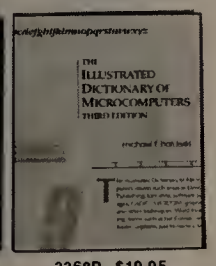

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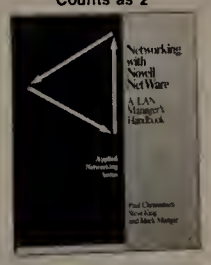

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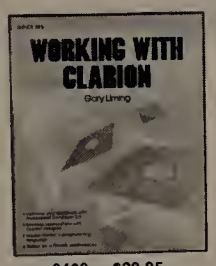

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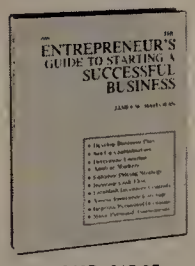

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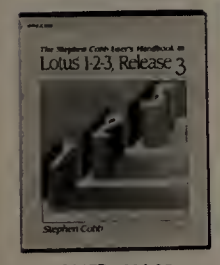

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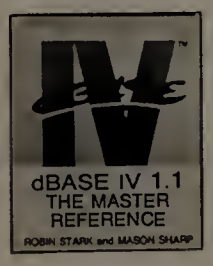

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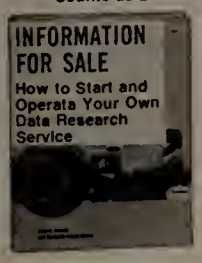

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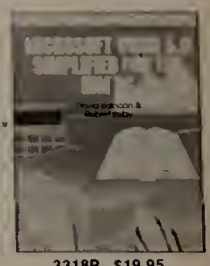

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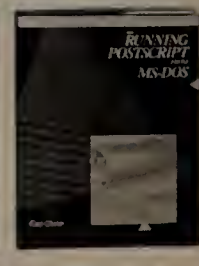

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Edited by ERIC BENDER

Some Users Balk at High Hardware Requirements

Windows Leaving Rivals in the Dust

Mainstay Packages Will Lift It Into Higher Orbit

Partly because of their added functionality, Windows packages are often harder to learn than expected, says Brian Livingston.

YVONNE HEMSEY

After six long years of false starts, *Windows* took off like a rocket with the May introduction of version 3.0, leaving behind a vaporous mixture of media hype and true user enthusiasm.

Sales figures clearly demonstrate that *Windows 3.0* is a world-beater, bringing direction to a marketplace that had been divided between an ineffectual *Windows 2.x*, the unfulfilled promises of OS/2 Presentation Manager, and high-priced Macintoshes.

Software Publishers Association (SPA) audits show *Windows* clearly outpacing competing graphical environments, with North American application shipments passing the $100 million mark in the third quarter—more than triple third-quarter 1989 sales. In fact, *Windows* revenues reached four-fifths the volume of Macintosh application sales, which grew only 6 percent in the third quarter, says SPA research director Ann Stephens. Meanwhile, OS/2 sales look like a speck on a rapidly receding planet.

Still Missing: Applications

So why aren't more people you know using *Windows?* First, many of the most popular applications simply haven't yet been rewritten for it. Lotus, WordPerfect, and many other developers who bet on the ill-fated OS/2 Presentation Manager environment are now playing catch-up.

Additionally, using *Windows* has its frustrations. The "insufficient memory" message is all too common when you're trying to run character-based DOS applications under *Windows*, reports Irving Samuels, Capital PC User Group president. "Less than 5 percent of our members use it. *Windows* takes too much memory, it's too slow, and there's too much complexity."

Using *Windows* as a task switcher between DOS applications isn't worth the hassle for most people, agrees Jerry Schneider, secretary of the Association of PC User Groups in Burke, Virginia. "To really take advantage of *Windows*, you need to multitask *Windows* applications."

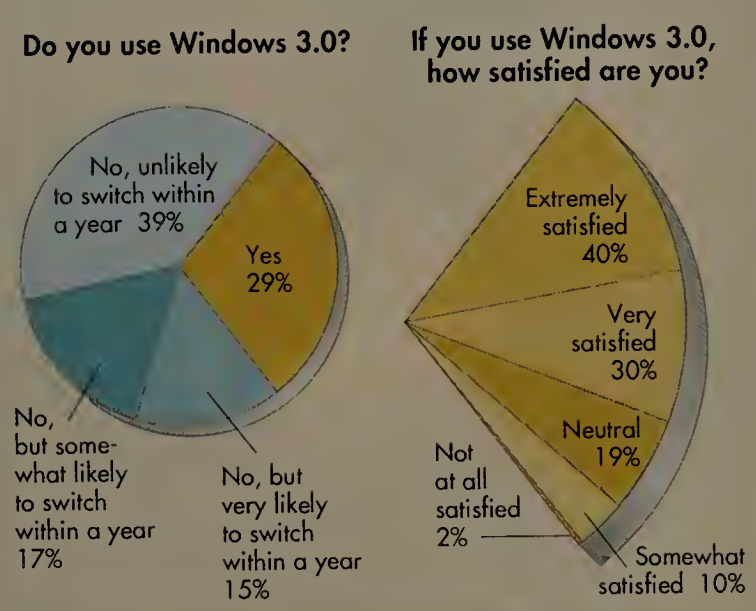
You also need far more substantial hardware than the 1MB 286-based PC with a 40MB hard drive that Microsoft touts, says Brian Livingston, a New York City consultant. "Anything less than a 25-MHz 386 with a super-VGA display is unacceptable." In fact, he found that 16-inch, 1024-by-768 resolution monitors were required for word processing and spreadsheet work on the 100-user network he designed for a Wall Street investment bank.

Moreover, Livingston says, *Windows* requires more learning than advertised—in part because *Windows* packages offer "two to three times the functionality of character-based applications." But once you're over the hump, *Windows* apps are friendlier, says Schneider: "If you haven't been computing before, it's a good place to learn."

PC World's research indicates that almost a third of its readers already run with *Windows*. Another third of the readers say they are likely to buy a *Windows* application later this year when the most popular PC applications arrive for the environment. For example, *WordPerfect for Windows* figures in twice as many purchase plans as *Microsoft Word for Windows*. When other bell ringers like *1-2-3 for Windows* arrive this summer, application sales should really take off. —*Mike Hogan*

Windows 3.0 Gains Backers

From a November 1990 survey of 225 PC World readers



Almost a third of PC World's readers regularly use Windows 3.0 software, and another third say they are likely to make the jump within a year. Most users report high satisfaction.

Whereto, High Resolution?

XGA, TIGA, CEG Compete for Backers

When the going gets graphical, the graphics user gets better resolution. As *Windows* and other high-end graphical applications spread, VGA's 640-by-480-pixel resolution begins to seem low end. But while everyone agrees that the next step up is 1024 by 768, it's not clear that any single hardware standard will prevail, and that uncertainty raises compatibility concerns for users.

That's true even though IBM has introduced Extended Graphics Array (XGA) and positioned it as VGA's successor. The industry is underwhelmed by XGA—at least in its first incarnation. Analysts say that competitive products offer equal or better performance and more software support for less money.

"XGA is a very good architecture—why such a feeble first implementation?" asks Jon Peddie, publisher of the *PCGraphics Report* in Oakland, California. In particular, Peddie and others damn XGA's relatively high cost and IBM's obsession with flicker-prone interlaced monitors.

XGA's largest rival, the Texas Instruments Graphics Architecture (TIGA) standard, keeps plowing ahead. Costs of entry-level TIGA boards are dropping below $500, and TI recently disclosed the first deal under which a major supplier, Zenith Data Systems, will bundle a TIGA board rather than sell it separately.

Still, every graphics adapter IBM has melded onto a motherboard has become a standard. IBM is publishing XGA hardware details, and even some board makers who just finished cloning IBM's now-obsolete 8514/A are scurrying to bring out compatible products. These should appear by mid-1992, when observers expect both IBM and its rivals to support noninterlaced displays as well.

Code of Many Colors

Despite this high-end battle, "VGA will have a very long, fruitful life," predicts International Data Corporation analyst Joan-Carol Brigham. With VGA now shipping on most business PCs, board makers and PC suppliers are adding various enhancements.

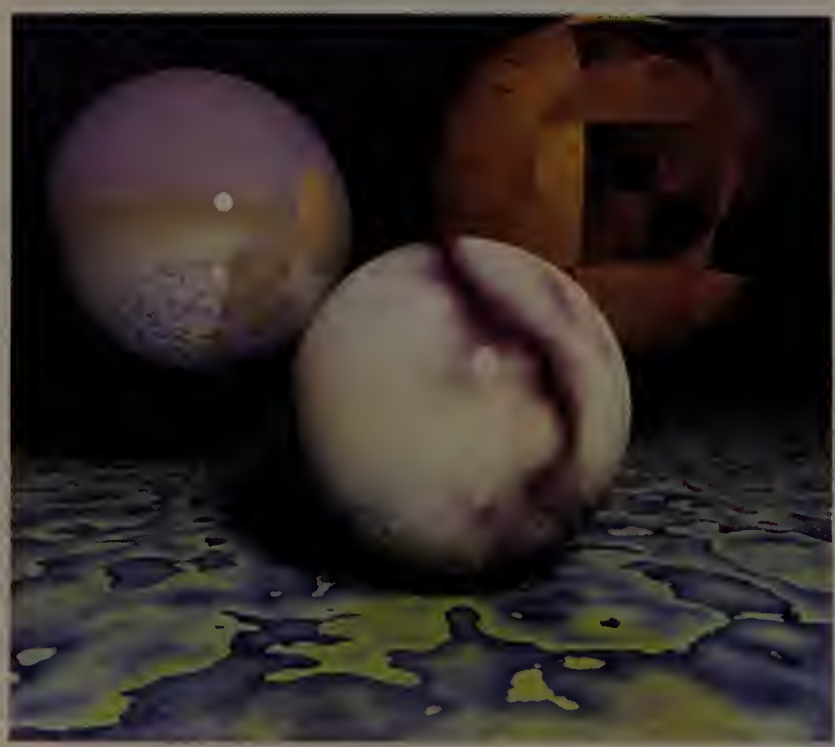
Among recent options are huge color palettes that provide surprisingly lifelike images. There's a sleeper here: Continuous Edge Graphics (CEG) from Edsun Laboratories in Waltham, Massachusetts, an inexpensive chip that can produce more than 790,000 colors on a standard VGA screen.

Cleverly removing "jaggies" from fonts and lines, CEG "can offer better WYSIWYG and better-looking presentations," notes Jake Richter, president of Panacea, a graphics developer in Londonderry, New Hampshire. "We're quite bullish about it," says Michel Castro, analyst with Dataquest in San Jose, California. If CEG works without compatibility or performance problems and gathers sufficient software support, "it will be a really good solution and will extend the life of VGA at the expense of XGA." CEG will appear early this year in boards from Monolithic, Genoa, and other suppliers as well as in certain 386 models from Epson, Northgate, Ergo Computing, and others.

The biggest hurdle for all these new graphic options is lack of software support. The *Windows 3.0* drivers offered for XGA, TIGA, and CEG solve only part of that problem.

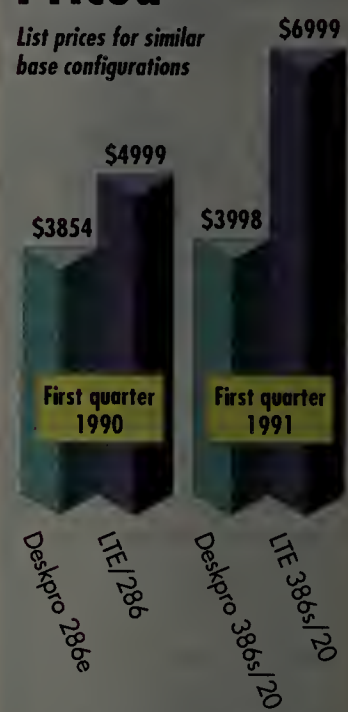
Another barrier is cost, especially since 1024 by 768 resolution calls for larger monitors (mainly because text is very small on a 14-inch monitor). A 16-inch display may cost almost twice as much as a 14-inch model, but this pricing "is all a question of volume," Dataquest's Castro points out. Price tags on high-resolution boards fall with costs for memory and other silicon.

Software developers, however, caution that the mainstream will be slow to shift. Today there's surprisingly little user demand for application support beyond standard VGA, notes Tim Davenport, general manager of Lotus's graphics division. An upscale standard will happen only "when IBM, Compaq, and the others put it in the machine for a good price." In the meantime, Davenport adds, inexpensive color printers need to catch up with today's adapters. —*E. B.*



Edsun's inexpensive CEG chip brings stunning photolike color images to VGA and dramatically improves on-screen text and lines.

Notebooks Stay High Priced



Notebook PCs offer ever-better performance and displays, but they still carry a large premium over desktop systems. A year ago you paid 30 percent more for a Compaq 286 notebook than for a similarly equipped desktop. Currently you pay 75 percent more for a Compaq SX notebook than for the corresponding desktop. (Desktop system costs include monochrome VGA monitor.)

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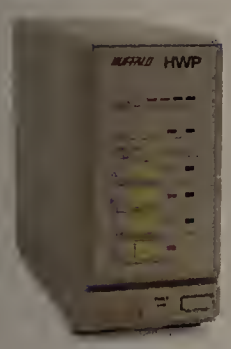

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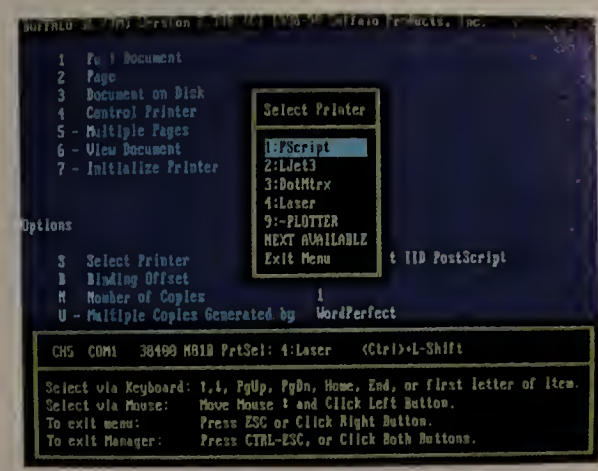

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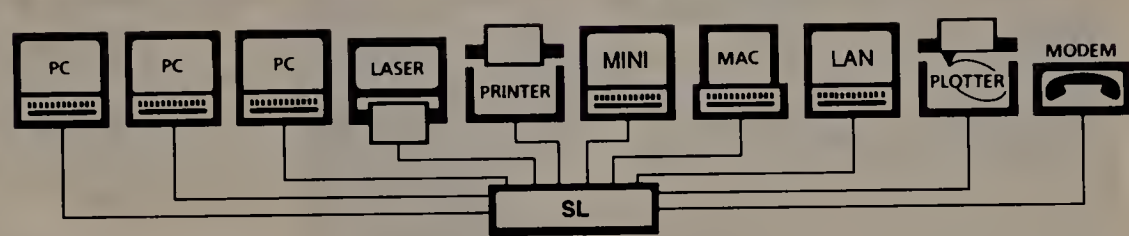

User Upgradable Memory:
From 256KB to 16MB buffer

Input/Output Settings – 4/1 or 3/2:
All parallel ports; user configurable as either three inputs to two outputs, or four inputs to one output, buffered auto-switch

Rapid Data Transfer – 100,000 cps:
The HWP uses Direct Memory Access (DMA) for data transfers into the buffer, making the HWP hardware capable of receiving parallel data at the high rate of 100,000 characters per second.

Pop-up Menu or Front Panel Buttons:
Use either the pop-up menu or the front panel switches to select printers, select the next available printer, send multiple copies, clear data, and other functions.

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Simple Installation:
Plug in your cables; if desired, run the installation software for the pop-up menu

Workstations Vie for Desktop Sales

PC Makers Roll Out SPARCstation Clones

In a few months you'll be able to visit your local MicroAge or Nynex outlet and choose between a high-end PC and a UNIX workstation—as the lines between the two kinds of products blur even further.

Sun's hot-selling SPARCstation is being cloned by PC suppliers, including prominent mail-order firms CompuAdd and Northgate.

Workstation prices have plummeted below $10,000. Sun Microsystems' SPARCstation IPC, for example, costs $7995 with a 17-inch monochrome monitor, 8MB of memory, and a 207MB hard drive. That makes such entry-level RISC-based powerhouses price-competitive with high-end PCs. Of course, the latter now can match the workstations in raw performance.

So far, few customers have jumped from one platform to another. Technical users require the built-in multitasking, multiuser, and networking capabilities still found only on a UNIX workstation, while PC users are loath to give up the enormous range of DOS applications.

But crossovers are likely to increase. Several PC makers have introduced clones of Sun's popular SPARC workstations, using a chip set developed by LSI Logic of Milpitas, California. These suppliers include two large mail-order companies, Northgate Computer Systems of Eden Prairie, Minnesota, and CompuAdd of Austin, Texas.

Pursuing Nontechnical Users

Eagerness to jump into the workstation market isn't surprising. While PC sales are expected to remain relatively flat, analysts expect the U.S. workstation market to almost quadruple by 1994. Dataquest expects that by that time, 29 percent of such systems will sell to commercial rather than technical customers.

"Our customers in the PC market told us there was a big need for workstations," says Craig Edland, manager of CompuAdd's new advanced systems group. "They like to have one-stop shopping." Many of these users, he adds, already buy Sun workstations for everything from engineering to manufacturing to desktop publishing.

Not everyone agrees. Despite widespread rumors that Compaq is readying a RISC-based entry, Compaq North America president Michael Swavely denies any immediate plans to do so. He notes that incompatibilities between PC and workstation software stand in the way of user migration, adding that the far-off OS/2 3.0 (which will run on both PCs and RISC-based machines) could smooth the transition when it finally arrives. In the meantime, however, Swavely cites Dataquest figures indicating that 75 percent of all CAD systems sold are PC-based.

Crossing the Channel

In order to attract the broad ranks of nontechnical users, workstation vendors, led by Sun, are pushing hard to break into the PC's main distribution channel. Sun workstations will now sell through MicroAge, Nynex, and Intelligent Electronics (which owns Encore, Connecting Point, and Today's Business Centers). "If you want to buy a Mac or a PC, you just walk into [a local retailer] and pick one up. The same has not been true of workstations," notes Sun spokesperson John Loiacono. He adds that Sun is "going door to door" training dealers.

CompuAdd, though, will sell its systems direct rather than through the company's 90 stores. "We don't see this as a retail product," says CompuAdd's Edland. "It requires more technical expertise and more hand-holding."

And the highest-profile attempt to sell a sleek UNIX box through dealers—Businessland's push for the Next Computer—ended in a debacle. Last fall Next announced its systems will also be offered through high-end resellers and its own direct sales force. (Next is now shipping a second-generation system and impressive business applications such as Lotus's *Improv* spreadsheet, but analysts still question whether the company will survive.)

Overall, analysts say, workstation manufacturers will be most successful with companies that are moving from mini-based applications to a client-server architecture or building a critical application from scratch. "If I was an MIS director and my company was primarily PC based, I'd be hard-pressed to move over to a commercial use of the SPARCstation," says Steve Hess, vice president at Creative Strategies in Santa Clara, California. —*Roberta Furger*

Some PC makers are eager to capitalize on the rapid growth projected for the U.S. workstation market. By comparison, 15 million PCs were sold last year. (Source: International Data Corporation.)

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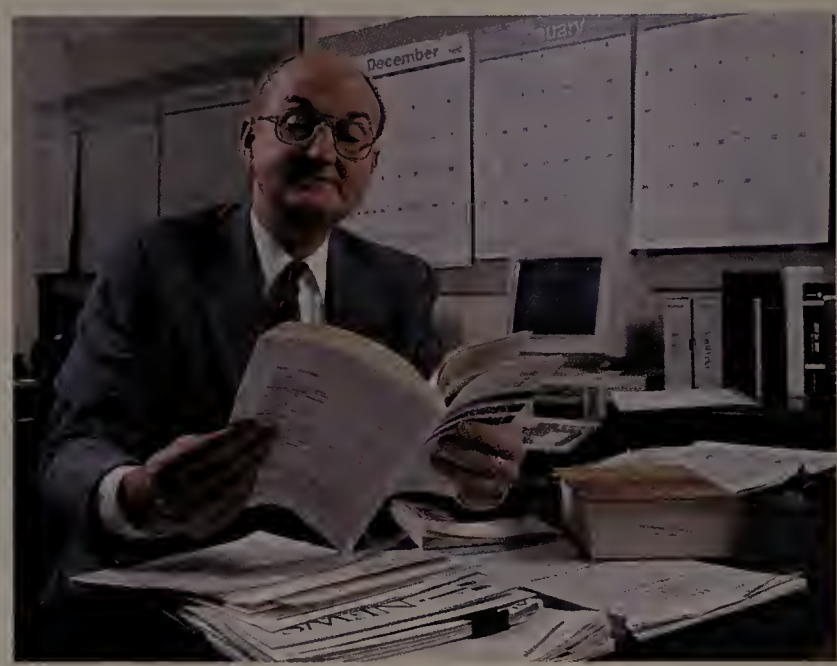
Document Managers Tackle Networks

Tracking Key Work Across an Organization

Network document-management software is proliferating as new users learn that whatever the other benefits of a local area network, it definitely provides more places to lose something.

These packages help control, track, retrieve, and archive documents created on networks. The fancier ones don't care what application was used to create a document, are compatible with an array of network operating systems, and can transparently track files across multiple network file servers.

"This is really a very powerful tool," says Hassel Parker, director of administration for Womble Carlyle Sandridge & Rice, a Winston-Salem, North Carolina, law firm. Parker wanted to be able to do full-text searches from any of his 450 workstations in several cities, and he turned to *PC DOCS*, a document manager from a Tallahassee, Florida, company of the same name. Says Parker, "I've got 40,000 documents on the network, and I can do a word search in less than two seconds." "It's very easy to use, and it eliminates the problem of lost documents," agrees Gary Harrop, director of administration for Holland & Hart, a Denver law firm with about 15 nodes running *PC DOCS*.

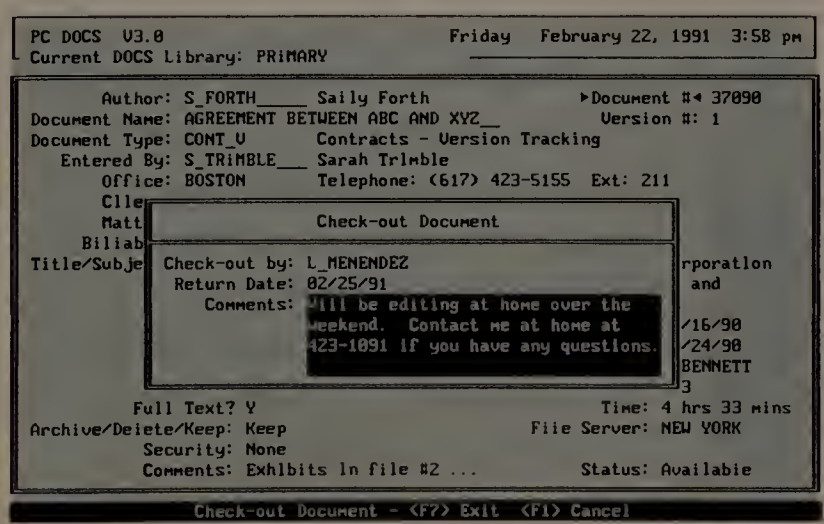


Hassel Parker, administrative director for a North Carolina law firm, finds document management software "a powerful tool."

The downside of document managers is that users have to standardize working files by filling out a detailed profile before opening a new document. Much of this task is automated, fortunately, and the system vastly simplifies the tracking of documents, which can be quickly retrieved by author, subject, title, revision, and other tags.

That kind of retrieval scheme can be particularly important for an organization spread out all over the country, says PC DOCS president Scott Kadlec. Document managers also can maintain varying levels of access security, boost safety by saving documents to both server and workstation disks, log work activity, and automatically archive documents.

These packages typically are bought by corporations and installed by professionals. Law firms have led the way, followed by insurers and other prodigious generators of paperwork. "Just about any network installation would benefit from some kind of document management," says Paul Zagaeski, senior analyst at The Yankee Group in Boston.



PC DOCS offers powerful retrieval features and flexibility to handle common practices like working on documents at home.

DONNA BISE

WordPerfectly Organized?

So far, network document managers tend to be limited in the applications they support. Many work only with *WordPerfect* documents and Novell nets, although cross-application and cross-network compatibility are becoming more common.

reQuest, from Harris & Paulson of Evergreen, Colorado, works only with *WordPerfect*, but upcoming editions will manage documents created in a wide array of applications. *reQuest* is built on Saros Corporation's *Mezzanine* client-server application platform for Novell and OS/2 *LAN Manager* networks, which offers a flexible, efficient platform for managing documents on big nets, says President David Stalker. Both text-based and *Windows* front ends are offered.

Pricing begins at around $200 per user but heads upward quickly as bells and whistles are added. *PC DOCS* costs $200 per workstation (plus $75 for a full-text option); by comparison, the starter pack for *PerfectSolution 2.0*, a small-net text-search and management product from PerfectSolution of Orem, Utah, costs $495 plus $125 per station. For $1495 and $195 per station, *PerfectSolution Advanced* integrates with third-party applications and adds time-billing accounting, while *PerfectSolution Global*, for wide area networks, is $2495 per server and $295 per workstation.

Other types of packages—ranging from utilities to network system software—offer increasingly capable file management. But analysts say that document managers should retain permanent possession of some valuable turf. "There's a gap between the creation of documents, which is a single-user process, and the management of documents, which is a group process," points out David Atlas, analyst with International Data Corporation in Framingham, Massachusetts. Yankee's Zagaeski predicts that future versions will cope with any kind of application file and become active participants in directing the flow of information. —*Mark Henricks*

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Visual Tools Aid Windows Program Developers

But Even Power Users Find These Packages a Stretch

Wouldn't it be great if you could design your own application with just the custom features *you* wanted? Some prominent *Windows 3.0* packages can help—but only if you already possess significant software-writing skills.

The highest-profile *Windows* programming aid is *ToolBook*, a $395 package from Asymetrix in Bellevue, Washington. (*DayBook*, a sample *ToolBook* application, is bundled with *Windows 3.0*, but that fancy, slow personal information manager may not be the best showpiece.) Spinnaker Software of Cambridge, Massachusetts, offers the $495 *Plus for the PC 2.0*. Echelon Development of Burlington, Massachusetts, has come out with the $295 *Windowcraft*, a leaner tool that runs on lower-end PCs.

These packages follow the trail blazed by the popular *HyperCard*, which comes with every Macintosh, and several earlier DOS packages that never hit the best-seller list. Like their predecessors, the *Windows* tools address a real but limited audience. "The promise is to open up this wonderful vista for users," says David Cearley, software program director for the Gartner Group in Stamford, Connecticut. "The reality is that it's only the power user who takes advantage of it."

Turning to New Tools

Still, many power users are more than pleased. Roger Newhall, sales training manager with Winthrop Pharmaceuticals/Kodak in New York City, had struggled to develop a training program to help medical salespeople talk to heart surgeons. After picking up Asymetrix's *ToolBook* package, says Newhall, "I did it in a month."

Joye Gowan, an assistant professor at Roane State Community College in Harriman, Tennessee, used *ToolBook* to write courseware that teaches remedial math students how to do such things as graph linear inequalities. While she has written programs in BASIC and the LOGO education-oriented language, she's not a professional programmer, and she was about ready to give up on writing for *Windows*. But with *ToolBook* in hand, "I'm already dreaming up new uses," Gowan says. "It's easy to program, even to create windows and motion."

Graphical front ends to data bases are also popular among early users. My Phan, a network consultant with Hewlett-Packard in Cupertino, California, built a *ToolBook* front end to help access a 10MB *dBASE IV* file of employee phone numbers. *ToolBook* was not much easier to learn than the standard *Windows* development tool kit, according to My Phan. But once you've learned it, application development is a breeze under *ToolBook*. "You can prototype things fast, to see what the screen will look like and how the user will react," he says.

Experience Required

Most vendors expect only savvy users like Newhall, Gowan, and Phan to pick up their products. "But it isn't tough programming by any stretch of the imagination," says Martin Oakes, Echelon Development's vice president of sales and marketing. "You don't have to know addresses or tag names or structures or calling sequences."

The packages help to solve otherwise knotty development puzzles—*Plus*, for instance, runs on both PCs and Macintoshes and thus lets you deliver software on both. "Say you're an MIS manager with a mix of Macs and PCs," explains Neal Goldman, senior product manager for *Plus*. "We can create a front end for an electronic mail system that's nice and graphical and runs on both platforms."

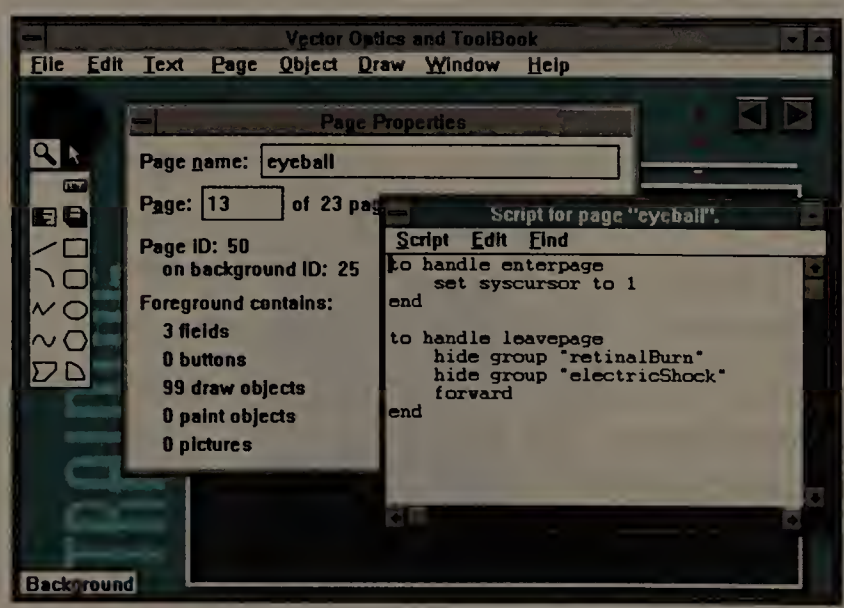
ToolBook prototypes let developers see what screens will look like and how users will react, notes Hewlett-Packard's My Phan.

While such packages are capable of creating soup-to-nuts programs, nonprofessionals should keep their projects within reasonable limits, Newhall emphasizes. "For small projects, do it yourself," he says. "For bigger, more involved projects, hire somebody else."

Typical *Windows* users will stick with off-the-shelf applications and utilities, and some of their frustrations will ebb as *Windows* packages gradually build tighter connections with each other. Another alternative for technically hip users: packages like *Bridge Toolkit* from the Softbridge Group in Cambridge, Massachusetts, that help knit existing applications together rather than develop new packages from scratch.

Eventually, vendors and analysts agree, all these programmers' helpers will become more accessible to the rest of us. "But to become real pervasive, end-user tools will take a couple of generations," says the Gartner Group's Cearley. —*Mark Henricks*

Mark Henricks is a contributing editor for PC World.



Developers' helpers like Asymetrix's ToolBook can aid in creating custom applications but demand strong programming skills.

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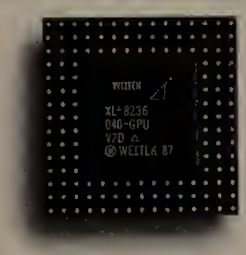

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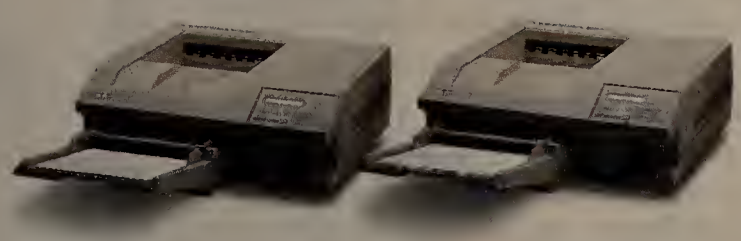

Of course, not everyone needs a PostScript printer. That's why the Epson laser line also includes the new EPL-7000. Like the EPL-7500, it offers brilliant MicroArt Printing, superior paper handling and HP compatibility. Plus a host of other serious business features, all loaded into an extremely affordable package. Moreover, the EPL-7000 even allows upgradability to the EPL-7500's true PostScript and RISC processing.

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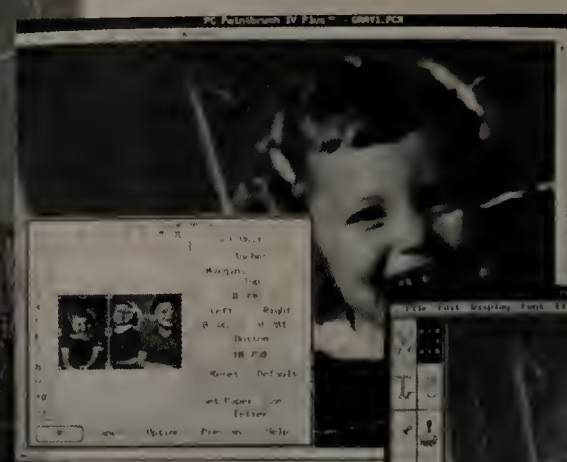

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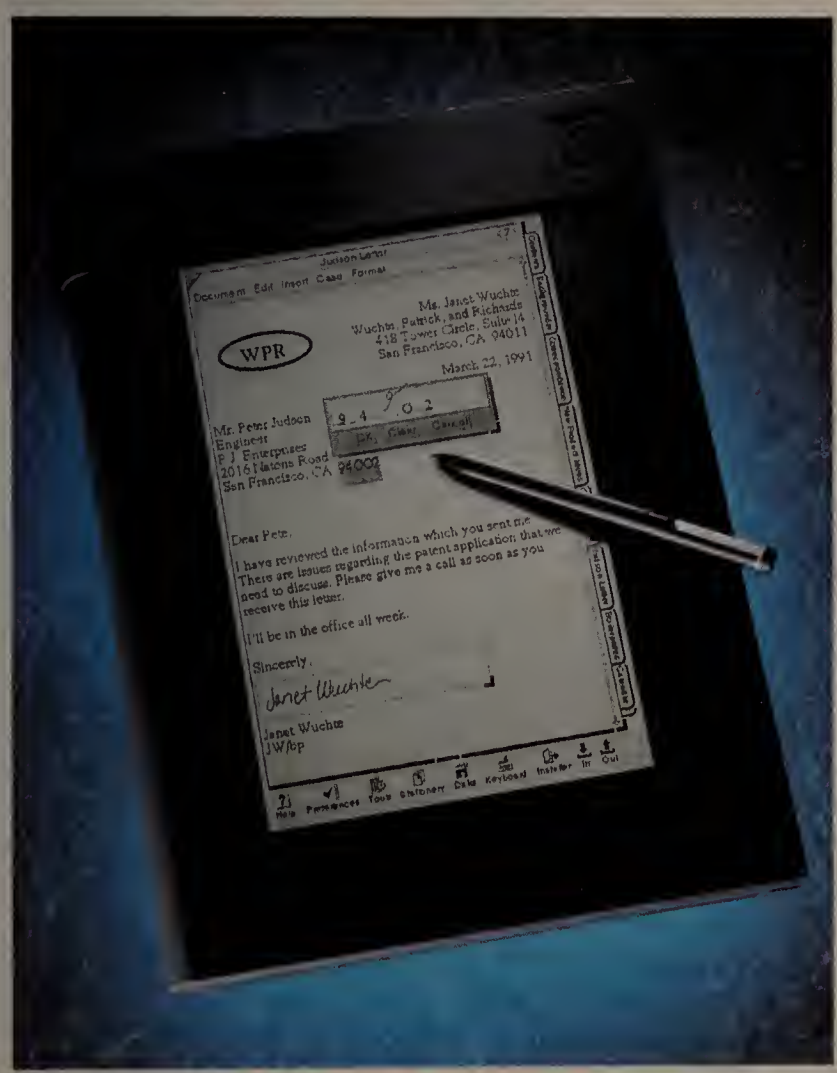
PenPoint Puts It in Writing

Introducing PenPoint, Go Corporation's operating system for pen-based PCs that will change the way you think about personal computing.



What's missing from this picture? A keyboard! PenPoint's user interface accepts handwritten input.

KIRK AMYX

Richard Landry

"What do you want for Christmas?" the radio talk show host asked me late last year.

It took me less than a second to respond. "I want a personal computer that's *really* personal," I replied. "One that lets me organize my information in any way I want, accompanies me wherever I go, and understands my handwriting."

Santa didn't answer my request last time around, but with any luck I'll have my dream machine in time to write next year's Christmas wish list.

Enter pen-based computing, courtesy of Go Corporation and its PenPoint operating system. Simply put, PenPoint is a software package that lets users run a notebook PC with a pen instead of a keyboard. But it's more than that, too. PenPoint defines a new way of interacting with electronic information—a simpler and more natural way, proponents argue.

Support on the Way

IBM is the first hardware vendor to declare support for PenPoint, but software backers already include Borland, Lotus, WordPerfect, and Slate, a start-up whose staff includes Dan Bricklin and Bob Frankston, codevelopers of the pioneer spreadsheet *VisiCalc*. (Noticeably absent from the list is Microsoft—see the sidebar "Windows at Your Pen Point.")

Pen-based PCs running PenPoint will appear on the 1991 COMDEX Fall show floor along with a host of applications. In the meantime, corporations can send their in-house developers to Go's five-day application development course and begin coding with the PenPoint software development kit or Slate's *PenApps* forms-based programming system (see the sidebar "Developers Create Go-Ahead Software").

Go isn't a hardware company, but it is producing a limited number of "pilot" notebooks to help developers test their PenPoint applications. The 9-by-13-by-1-inch system weighs about 4½ pounds and comes equipped with 4MB of RAM for programs and data; a multifunction adapter for battery charger, keyboard, SCSI and serial devices, and AppleTalk connection; plus a combo 2400-bps modem/send-receive fax. You write on the notebook's 6-by-9-inch screen with a special electronic pen. The software development kit runs on standard DOS-based PCs.

New Software for New Users

Handwriting recognition has been on the PC scene for years, and a year ago Grid in-

SNAPSHOT

PenPoint Operating System

Go Corporation's operating system for pen-based PCs combines state-of-the-art technology with unprecedented ease of use. The combination could launch a new era in personal computers.

KEY FEATURES

- **Pen-driven notebook user interface**
- **Handwriting-recognition capabilities**
- **Compound-document architecture with hot links within or between documents**
- **Innovative communications facilities**
- **Compact, object-oriented design**

AVAILABILITY

Software development kits in February 1991; end-user version in fall of 1991

PRICING

$1295 for 5-day application development course and software development kit; approximately $4000 for pilot hardware

Go Corp.
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Foster City, CA 94404
415/345-7400,
415/345-9833 (fax)

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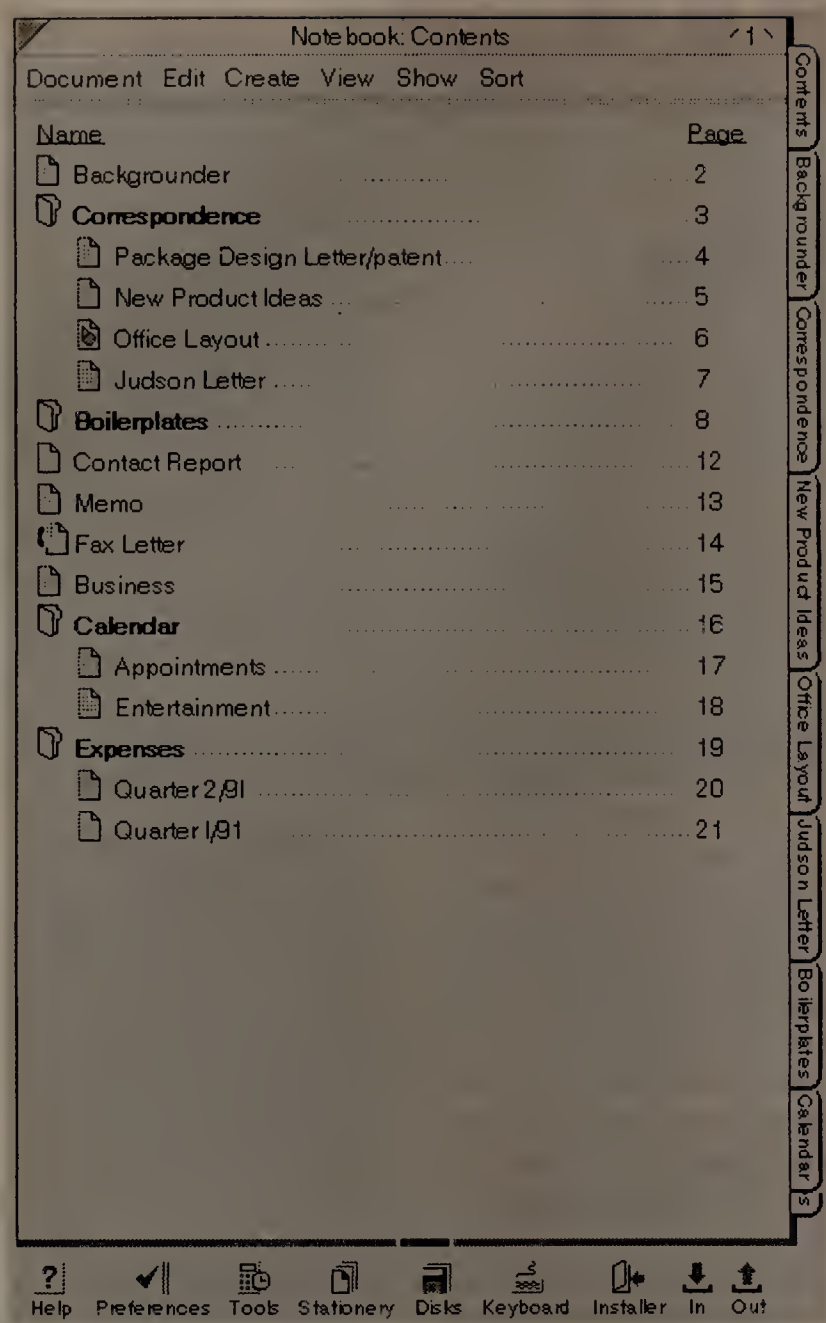
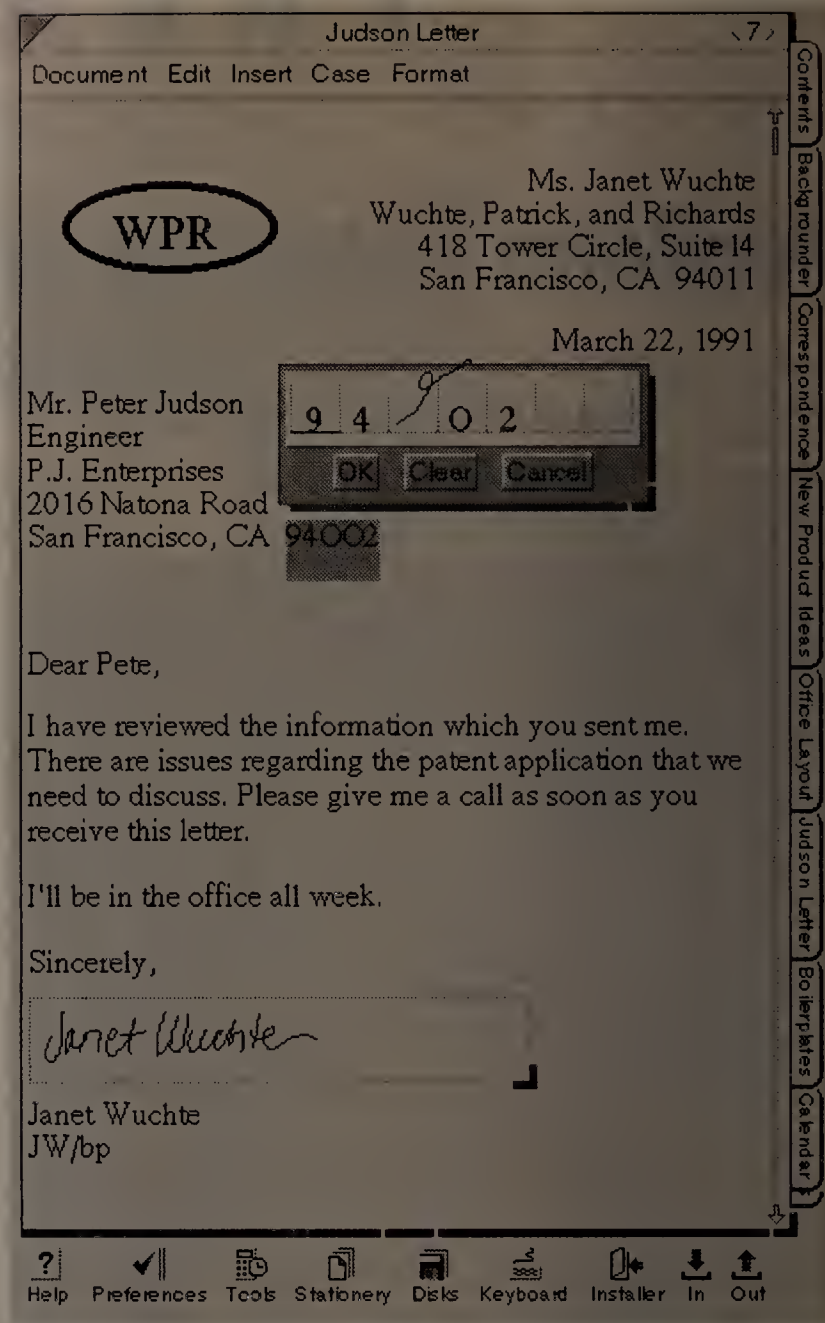


PenPoint uses a table of contents as a directory. A simple pen gesture calls up the desired file.



Circle an item to open a correction window, delete any mistakes, then write the corrections.

troduced the GridPad, a portable DOS-based system optimized for pen input. But the GridPad and its kin mainly target "clipboard" applications like inventory taking, field service, and package delivery. Here the pen-based PC acts as a substitute for reams of multipart forms, and its users are typically nonprofessionals who wouldn't ordinarily use a computer in their daily work.

PenPoint is aimed at this audience and at many others too: executives who wouldn't dream of touching a PC, the millions of folks in every walk of life who are afraid of them, and everyone in between. Nor is PenPoint just for hand-held notebooks. Ultimately, it should find its way into devices as varied as pocket-sized organizers and wall-sized whiteboards.

Designed originally for 386 systems but meant ultimately to run with a wide variety of processors, PenPoint—with its extensive help system—requires about 3.5MB of RAM. That's not much compared to *Windows* or OS/2 requirements, but it's a lot for PCs that are likely to have only RAM storage, without the benefit of a hard disk.

But PenPoint's object-oriented architecture means that a notebook loaded with a complete set of PenPoint applications will require much less storage than a conventional system. PenPoint programs are small—a fully featured application takes up as little as 200K of storage, compared with several megabytes for a typical *Windows* application. Developers simply rely on PenPoint's built-in services for a lot of their programs' functionality.

Despite PenPoint's compactness, it includes everything you would expect from a next-generation operating system, and more: graphical user interface, on-the-fly fonts, multitasking, *NewWave*-like compound-document architecture, advanced communications support, and—of course—handwriting recognition and the ability to understand certain gestures you make with the pen.

Notebook User Interface: Beyond GUI

PenPoint's biggest breakthrough is an organizing metaphor called the notebook user interface. Rather than force you to think in terms of programs and files, PenPoint groups information into "notebooks." Each notebook includes a "table of contents" that serves as a directory of all relevant files, or "documents" in Go parlance. You can maintain several notebooks at once, each including different documents or copies of the same documents organized differently. When you want to create a new document, you simply select from different kinds of "stationery," which represent document templates linked to

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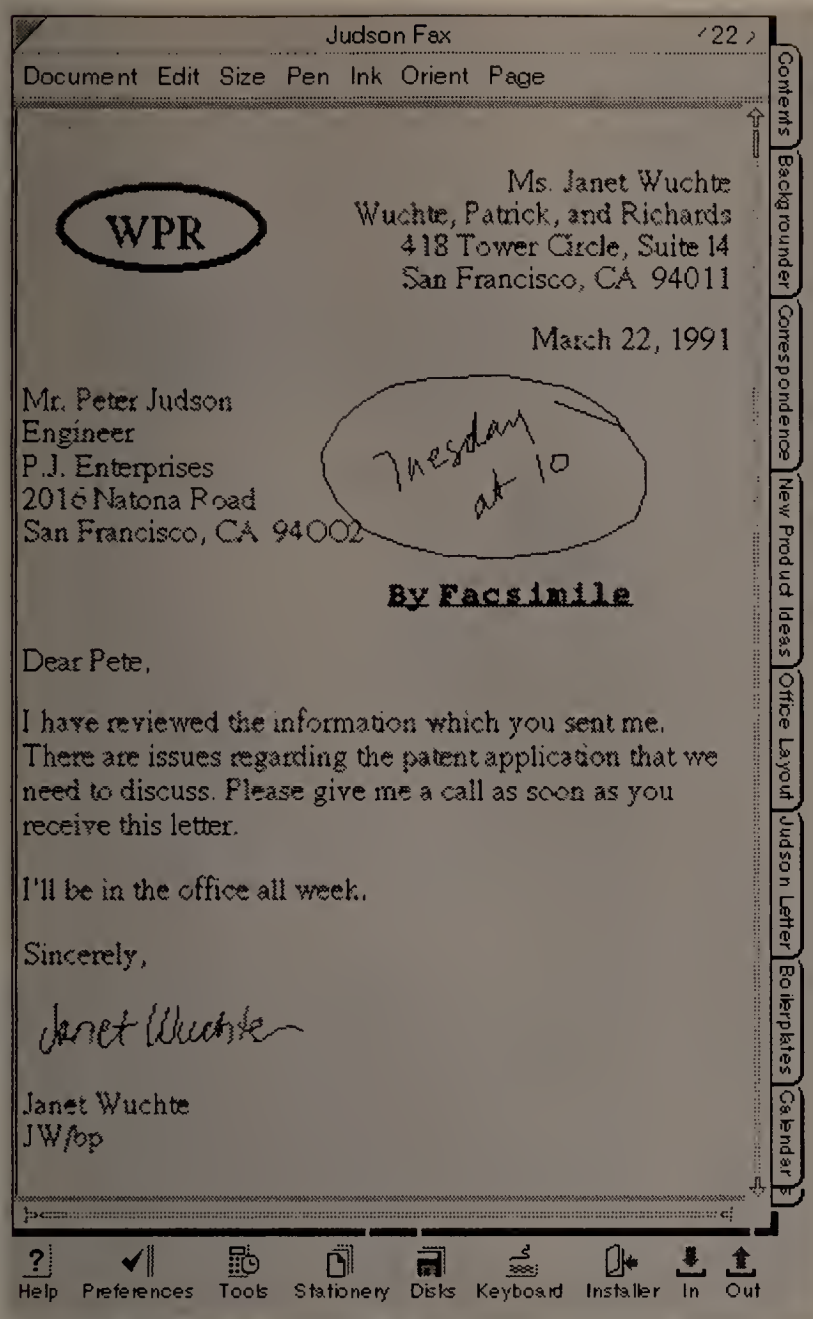


A PenPoint user can receive a file on his or her built-in fax board and make notes and additions by hand.

the PenPoint programs installed in your system. You can embed documents in one another, with "hot links" that allow you to update a document wherever it resides. You can also include simple reference buttons that allow you to hop between bits of information in one document or several documents.

You get more direct power over computer resources than you've ever experienced, and you can create types of information that simply can't exist on paper or in competing PC environments. You can build an electronic reference book, for example, with predefined links between different kinds of information plus those you add as you go, or on-line forms that fax themselves automatically after you fill them out, or documents with built-in alarms that "wake up" your notebook at preset times.

How does handwriting recognition fit into the picture? PenPoint understands printing, not cursive handwriting, so users aren't likely to use a PenPoint notebook to compose their novels. For simply banging out text, a pen-based system won't match a keyboard-driven computer.

But handwriting recognition alone isn't what makes PenPoint so easy and intuitive. Instead, PenPoint relies on a simple gestural language to help users access its power. Tap your pen on a word or image to select it. Make a check

WINDOWS AT YOUR PEN POINT

Eric Bender

While Go Corporation insists that pen-based computing represents radical change that requires a radical new architecture, Microsoft is bringing pen-based extensions to *Windows*. "This is not a niche," explains Pradeep Singh, group product manager for *Pen Windows*. "The impact is mainstream." In his view, few users will heed Go's call to leave their existing DOS and *Windows* applications behind.

Microsoft sees the potential application scenarios and benefits much the way Go does. You'll manipulate information more directly, says Singh, and "you'll be able to carry your information around with you." Pentops can operate in many settings where laptops can't, making them a much more natural extension of your office environment, he says.

Singh expects the first pentops to be clipboard-style memory-based systems along the line of Grid's GridPad, aimed at mobile nonprofessional users. Starting in 1992 will come managerial/professional portables, resembling today's notebooks except that the screen will include a CPU, so you can detach it and use it as a PC. At about $1000 more than a standard laptop, "this machine will make the [broad] market," he predicts. Next year Singh also expects pen-based systems that never leave the office ("then your desktop actually *is* a desktop"). Later will come consumer versions that fit in a shirt pocket.

"When the first machine ships, it will be able to run every existing *Windows* package," basically by treating pen input as if it were mouse input, Singh says. Applications must be redone to become "pen-aware" and exploit specific pen gestures (for example, a word processor would support handwritten annotations). Singh expects at least 20 pen-aware applications by late 1991, about the time "pen-centric" applications begin appearing as well.

Pen Windows has not evolved as far as PenPoint—for instance, systemwide core gestures have not been finalized. Additionally, it's missing much of PenPoint's power, such as mobile connectivity and optimization for low-memory configurations. Still, Singh says *Pen Windows* machines will ship late this year. Grid, NCR, Wang, and others will back *Pen Windows*. So will many software developers—although few pioneers, in hardware or software, will bypass Go.

DEVELOPERS CREATE GO-AHEAD SOFTWARE

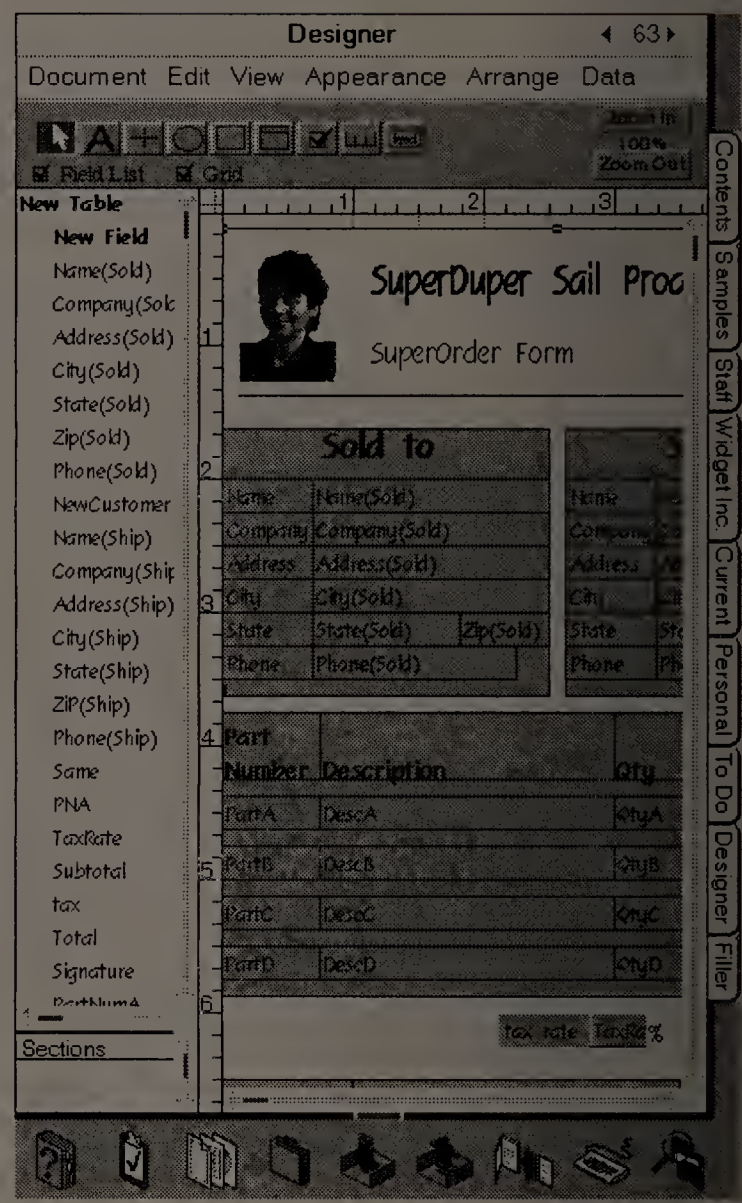
Eric Bender

Borland, Lotus, WordPerfect, and many smaller firms are working away to create packages for Go's PenPoint environment. Among applications under way are a forms tool, a spreadsheet, a word processor, a drawing package, an electronic mail program, a fax package, a note taker, a visual data base, and a personal information manager.

The first PenPoint package will be an application development tool from Slate Corporation of Scottsdale, Arizona. Slate's *PenApps* helps developers quickly prototype and then create pen-based applications, even if the programmers are unfamiliar with the sophisticated PenPoint architecture.

PenApps lets you interactively draw a forms-oriented interface, link forms to data, and then manipulate them with a host of built-in or customized capabilities. Slate added pen-oriented features such as intelligent gesture targeting (text entered near a field is automatically entered in that field), deferred handwriting translation (so the user can keep talking with a client and clean up the entries later), and "SmartFields" (which offer a pop-up list of the most-recent entries in a given field).

"Applications should be designed with pen in mind," declares Dan Bricklin, vice president for Slate's Boston development center. A pen gesture can carry much more information than a mouse click and put you in direct control over the computer—closer to "do-what-I-mean" computing, he says. "It feels so different to use these machines; the mouse and the keyboard are just so primitive by comparison. This is unstoppable."



Slate's PenApps is a forms-oriented tool designed to speed development of PenPoint applications.

mark to change its properties. Draw a circle around it to edit it. Draw an *x* through it to delete it.

You employ gestures like these to fill out forms, set or change appointment times, or select custom options in a canned sales presentation. Handwriting recognition comes into play to handle small bits of textual information—the name of your lunch date, for example. You might edit a text file received through the notebook's modem, fax, or network connection and return it to the sender with a signed approval.

As the soul of an electronic day-timer or notebook, PenPoint makes sense for mobile professionals like on-the-go executives. Its unique communications architecture helps further—for example, while you're traveling you can keep working as if you're connected to a network or phone line, because the system automatically completes communications tasks once it's hooked up again.

A PC for the Rest of Us?

Go boasts an impressive employee roster: CEO Jerrold Kaplan developed the artificial intelligence technology in Lotus's *Agenda*, and Software Vice President Robert Carr created the innovative integrated package *Framework*. Go is also home to several ex-Apple employees, many of whom say they were drawn to the company for the same reason they found working at Apple so exciting—the opportunity to open the world of personal computing to the enormous numbers of people who have yet to taste its benefits.

Will PenPoint fulfill this promise? Go faces serious obstacles—including Microsoft's determination to keep the pen-based PC market in its grasp. But PenPoint is certainly the most significant advance in personal computer software in years. It may just be the match that ignites a new era of PC usage. And that's at the top of my wish list for 1991.

Richard Landry is PC World's *editor in chief. Eric Bender is* PC World's *East Coast editor.*

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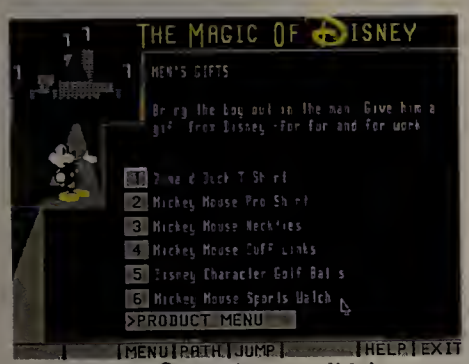
Editor's Note:

I'm very happy to have The PRODIGY® Service in this catalog. A while back, the folks at The PRODIGY® Service sent me a copy to take a look at. I had never seen it before and within a week, I was completely hooked. My IBM® PS/2® Model 30 has been smokin' since the Fiorentino house has "connected to everything." We've even done some shopping: my wife takes care of last minute wedding, birthday and anniversary gifts from a great little silver shop she found on-line using The PRODIGY® Service. I'm a camera nut, and I've ordered several lenses, a tripod and some great gadgets I've never seen anywhere through The PRODIGY® Service. (The PRODIGY® Service also came in handy when I ordered a garage door opener from Sears.) And the kids are learning about all kinds of things with The PRODIGY® Service's on-line Weekly Reader® and 21-volume encyclopedia.

Keep reading, because there's more to The PRODIGY® Service. Like news, weather, sports, travel and financial information. When I first got my home computer, frankly, I didn't do much with it. Now, with The PRODIGY® Service, I'm using it all the time. I guess it's true when they say that The PRODIGY® Service is truly what the PC was invented for. I think you'll love it. *– Carl Fiorentino, President, TigerSoftware.*

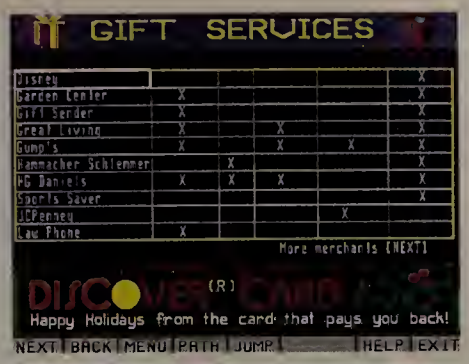
What Is The PRODIGY® Service? A jam-packed tower of information and services, packaged with the software needed to get at it. This is value! And it all flows so easily, a child could do it. But this is no lightweight deal; the wealth of information, the convenience of shopping and transaction services, the power of instant financial data, all team up to make The PRODIGY® Service a solid investment in your future.



The PRODIGY® Service can give you and your family hours of exciting and intelligent entertainment. (All for the price of this Start-up Kit and one low, monthly fee. No extra charges for time!)

The PRODIGY® Service puts you in communication! Not just with data and business, but with real people like yourself. The PRODIGY® Service is spreading like wildfire. There's probably someone you'd like to meet starting The PRODIGY® Service for the first time a thousand miles away. Find out for yourself on The PRODIGY® Service's bulletin board and mailbox service. Membership includes 30 free personal messages to other members each month. (Additional messages will be billed at $0.25 each.)

Travel. The PRODIGY® Service is organized in sensible, easy to see and use sections. Check out The PRODIGY® Service's bargains in *Travel Club,* or plan your own adventure with *Travel Tips* and *Events OnLine.* Then easily book your own airline flights — you can save up to 30%! See actual arrival/departure times along with all the other information you need. Even make hotel, car, and restaurant reservations.



Communicate. As a PRODIGY® Service member, you have an electronic mailbox. Send and receive messages, advice and information with other members. Or use a specialized Bulletin Board to put up notices and see the latest developments.

Play. There're games, contests and exciting quizzes for kids of all ages. Play "CEO," an on-going game (like Dungeons and Dragons) that you play with other members. Join an existing game against strangers, or start a game just for you and your friends. Or maybe you like to play *Where in the World is Carmen Sandiego?*

Shop. Browse and shop with numerous stores: Sears, JC Penney, SuperStore, Sam Goody, Wolf Camera, Spiegel and more. Take advantage of specials offered continually! *(Selected areas.)*

Finance. Buy and sell stocks and bonds as you watch Dow Jones updates on the screen.

Bank. Pay your bills, transfer funds, see how much is in your account, all from within The PRODIGY® Service! Actually save money by skipping check and stamp costs. (Note: some banks may require a charge for these services.)

Learn. Do your research with the on-line encyclopedia. Learn by playing educational games. Keep on top of your areas of expertise with The PRODIGY® Service's specialized Bulletin Boards.

News. Stay informed with up-to-the minute news. Hot, new developments are displayed on the screen when you start The PRODIGY® Service, or you can look for the news you want.

Weather. Local and foreign Accu-Weather forecasts are updated continually. Going somewhere? Check the weather before you leave!

Sports. Follow the latest scores — baseball, football, basketball, hockey and more. See the latest news, stats, schedules and standings. And between games play sports trivia!

Free Newsletter. Receive *The Prodigy Star,*™ a regular publication filled with tips and specials. Always something new and fun!

The Best Part! One Flat Monthly Fee!

Unlike America On-Line, CompuServe, GE Genie and Dow Jones News Retrieval, The PRODIGY® Service's $12.95 per month charge is for unlimited time use. You could save hundreds per month over the others.

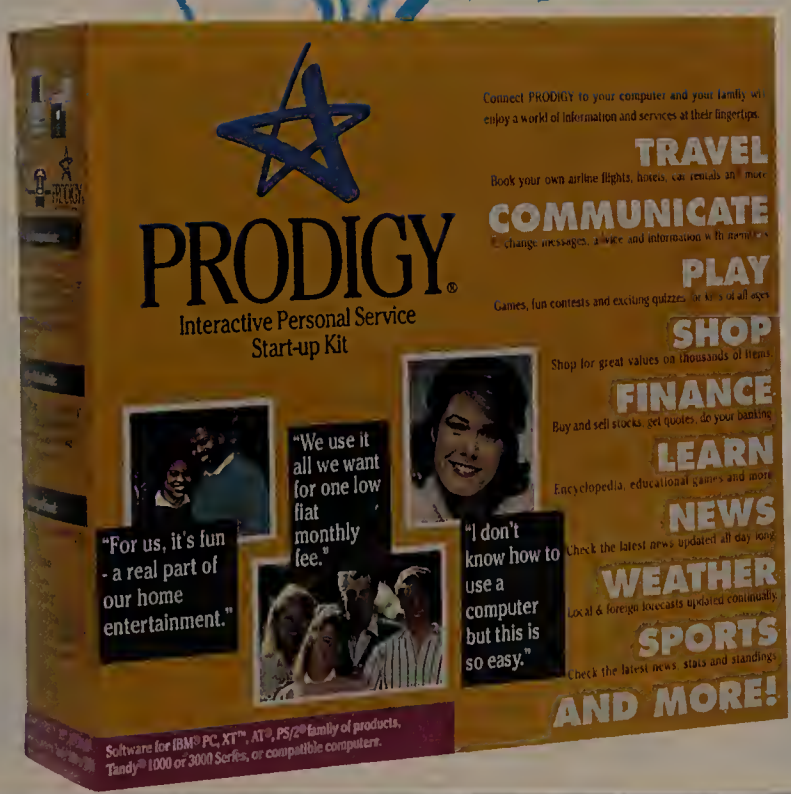
Want More? The PRODIGY® Service is always changing, always growing. If people are interested in it, The PRODIGY® Service covers it.

Buy 1, Get 5 Free! One membership allows 5 additional household members to use The PRODIGY® Service. Each with their own ID and password.

SPECIAL MODEM PACK

Includes complete PRODIGY® Service software with advanced, new Hayes "Palm-size" Modem.

The PRODIGY® Service Start-Up Kit includes Hayes modem for use with The PRODIGY® Service as well as your other software requiring a modem.



PRODIGY

RY 1780 The PRODIGY® Service Start-Up Kit 5¼" & 3½" $39.95

RY 1790 The PRODIGY® Service Start-Up Kit w/Hayes Modem 5¼" & 3½" .. $149.95

Requires IBM PC, XT, AT, PS/2 or compatible; 512K and DOS 2.0 or higher; VGA, MCGA, EGA, CGA, Hercules or compatible graphics; floppy drive; 1200 or 2400 bps Hayes or compatible modem.

TIGERSOFTWARE FREE FEDERAL EXPRESS TO ORDER 1-800-888-4437

Circle 259 on reader service card

If Time is Your Only Inventory...

Timeslips® III... Faster, Easier Time And Expense Recording For Any Business.

Do you know which jobs are the most profitable and which ones are a complete waste of time? Do you know which clients are profitable and which aren't? Are you billing all of the time you're entitled to or do billable hours "slip through the cracks?"

For people who sell their time, tracking and billing for it may be the toughest job of all. Many professionals, including architects, CPAs, designers, law firms, ad agencies, engineers, repair services, project managers and others are turning to the software system designed specifically to turn time into money by precisely timing, calculating and reporting all time spent on each specific project.

Timeslips III is fast, easy, flexible time and expense recording along with a complete set of financial and productivity analysis tools. It's so simple to use, it practically runs itself and features a useful array of pop-up functions that can be accessed anytime — and from within any application.

Your bills will be detailed and authoritative, and can contain custom reports that you prepare in just seconds. Arrange them the way you want, place messages in them and more.

Here's a sample...

- Have a client on the phone? Press *TSTimer's* hot key and jot down notes.
- Returning from a business trip? Just type in your expenses.
- Spend hours writing an analysis? Tell *Timeslips* who is paying for it.
- Want to manipulate your *Timeslips* data? Export it to Lotus 1-2-3.
- Need to know who's billing the most hours this month? *Timeslips* knows.

The Time and Billing Software of Choice.

Timeslips III lets you record, analyze, and bill both time and expenses with ease and complete accuracy. In fact, many customers report up to a 25% increase in billable time. With an equal improvement to the bottom line. Which is the kind of performance that's made Timeslips III the most widely used time and billing software in business today.

Track and bill activities with Timeslips III in great detail. With a handy pop-up timer that records your time while you work. With custom invoices in formats you determine. And with accounts receivable reports and billing worksheets so you can keep a close watch on every minute you spend, and every dollar you have coming to you.

Track 250 activities, for as many as 250 people, working on 128 projects per client — with a maximum of 3,400 clients.

Reporting Power.

Client Financial Reports. The Client Billing Worksheet summarizes unbilled and unposted activity for each client. Review the information that will appear on your client's bills before you send them out.

Aging Reports. Get an analysis of your client's creditworthiness. A complete 30-60-90 day overdue analysis including the date, amount of last payment and client's phone number.

Transaction Reports. Lets you search quickly for payments, deposits and even create custom reports such as a daily payment register.

Client Fund Report. Shows you all transactions including withdrawals, deposits and payments to and from each client's account for a complete financial analysis.

Productivity Reports. Timeslips III can show you the productivity of each project by creating an activity-by-activity breakdown. What was accomplished by whom, how long it took, and what the actual fee was for the completed project.

By generating custom reports you can design detailed column reports from the data in your time records. For example, create a daily time sheet report that includes date, professional, client, activity, description, accumulated hours and billable amount. Your customized reports can then be printed or exported to a spreadsheet, word processor or database via a simple text file.

Detail Reports. Itemize the contents of some, or all of your time records. For any number of professionals, clients and activities.

Summary Reports. Show total hours and dollars, dollars per hour and percentages by employee, client or activity. Summarize users, clients or activities for any date range.

Thousands of Ways to Create the Right Bill. Each office has its own particular needs. Each client is different. With Timeslips III, you can satisfy everyone. Create the precise billing format you need — move names and addresses to any position on your invoice, add billing phrases like "For Professional Services Rendered," or "Thanks for Your Payment." You can even create custom messages for designated clients.

Timeslips III Features:

- Detail services by activity, expense, project, or matter with complete descriptions.
- Automate your invoice preparation with convenient macros.
- Include several types of flat fees, such as absolute, minimum, maximum.
- Itemize and/or include totals for hours and expenses.
- Include dates, previous balances, aged receivables, employee initials, customized messages.

The Slip: A Definition.

The basic unit of information in *Timeslips III* is the Slip. A Slip is a record of **someone** — known in *Timeslips* as a User — doing **something** — a *Timeslips* Activity — for **somebody** else — the *Timeslips* Client.

Slips are very flexible and contain as much or as little detail as you like. Use a Slip to time an event. You can use the timer or enter the time manually. You can keep records of office overhead, unbillable time, photocopies, and things you never thought you would track. Slips allow you to be as specific or as general as you need to be.

Although there can be many variations on the Slip itself, each Slip falls into one of two basic categories: Timeslips and Expense Slips. Timeslips are records of Activities billed by time; Expense Slips are records of Activities billed by quantity.

Perfect For:

Accountants & CPAs	Interior Decorators
Actuaries	Law Firms
Advertising Agencies	Marketing Consultants
Architects	Photographers
Computer Consultants	Project Managers
Construction Managers	Psychologists
Departmental Billing	Public Relations Firms
Employment Agencies	Repair Depots
Engineers/Technicians	Typing Services
Financial Planners	Therapists
Gardening Services	Visiting Nurses
Graphic Designers	Plus All Service Firms!

"Today, Timeslips III is the best time and billing package available at any price..."
–Chicago Tribune

"Timeslips III is the overwhelming winner in terms of time and billing applications for the CPA market!"
–Dr. Lawrence A. Ponemon, KPMG Peat Marwick Research Fellow

B O N U S !

Timeslips III Speller™

Prevents Spelling Errors in Timeslips III Bills and Reports.

TSSpeller is an electronic spell-checker tailored specifically for use with *Timeslips III* time/expense-tracking and billing software. Depending on how you choose to work with it, *TSSpeller* can:

- monitor your keystrokes and report an apparent spelling error or "typo" immediately;
- check a field/block of text after you finish entering it;
- scan all your slips (or a subset of them) in a batch just prior to printing reports or bills.

Fixes Spelling Errors in TSTimer.

When using the exclusive "stopwatch" timer, or batch entering timesheets, Timeslips III Speller helps keep your spelling error free. If you misspell a word while typing, Timeslips III Speller automatically shows you the alternative words. Choose the correct word and resume typing.

Spell Checks When Reporting.

As you print bills, Timeslips III Speller confirms the accuracy of thousands of Timeslips. And alerts you to all misspellings.

TIMESLIPS
CORPORATION

TIMESLIPS III

RY 2600 Timeslips III 5¼" $239.95
RY 2605 Timeslips III 3½" $239.95
IBM PC, XT, AT, PS/2, compatibles with 384K.

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Circle 259 on reader service card

Make Your PC Run up to 60 Times Faster!

Unleash Your System's Hidden Potential for Blistering Speed!

Trapped deep within the architecture of your computer lies an enormous untapped potential for speed. Unfortunately, this vast resource has been neglected because no one could devise a way to unleash it. Until now.

FAST! is the brilliant caching system that actually increases the speed of your computer by up to 60 times! Simple to install, a snap to use, this software solution can make a stock XT outrun a full-blown 386! Then we loaded the 386 with FAST! and we almost blew the doors off the lab! (Keep reading for complete details on the head-to-head lab speed tests.)

How Can It Be Possible?

You're probably wondering exactly how this technology works. How can a software package have such a shattering impact on my computer? Although the authors are keeping the secret to themselves, they have shared information about where the slowdowns are within your system, where the speed is trapped and what has to be done to harness it. (See the CLOSE-UP box for details.)

They do tell us specifically, however, that the biggest system slowdown for your system is waiting for disk reads. When you use an application, you use it in "chunks" of various sizes, depending on the functions you are performing. Sure, you load it all at once, but it's used in bits and pieces. Your system must read back and forth, searching for these chunks of programs as they are needed by the application. You switch to another function, and the system must scramble again to find the required chunks.

A Perfectly Logical Solution...

One of the keys to the FAST! design is the addition of "intuitive logic" to the technique of caching, so your system actually anticipates what your CPU will be seeking and reads the information directly from the hard disk (or floppy) into a special buffer created within your RAM. This information is, in reality, retrieved before the system asks for it!

As a result, your CPU simply spends no time waiting for disk reads, so processing can be done as fast as the system is capable — faster than you've ever seen it! The more disk-intensive the application is, the more dramatic the increase in speed can be achieved using FAST! Database, spreadsheet and complex CAD systems, word processing, data transfer and more will achieve maximum response with FAST!

FAST! is also good for your system. By reducing the chaotic searches for data on your hard disk, it actually extends its life, reducing the damaging effects of constant wear. It's good for your software applications because they'll run leaner and faster, so you'll be more productive.

On a standard data transfer performance test, FAST! is 18 times faster than a standard AT — and 5 times faster than the leading competitor. In fact, an IBM XT with FAST! is faster than a Compaq DeskPro 386!

Don't Buy More Equipment!

You could spend thousands trying to achieve the speed required for truly efficient computing. Items like high-speed drives, turbo boards — even complete system upgrades try to overcome your system's inherent slowdown — waiting for disk reads.

Imagine What FAST! Can Do for a 386!

FAST! will deliver spectacular results on your IBM PC, XT, AT and PS/2, but imagine how much faster the "new generation" of ultra high-speed processing technology like the Compaq 386 or Intel's 386 Above Board will run using FAST! — they instantly leap into a new computing class!

FAST! Under Windows 3.0!

Charles Bermant, author of The Windows 3.0 Comparison, wrote "One solution (to the speed problem) is to replace Windows' disk cache, SMARTDRV.SYS, with another cache. One such program, FAST!, has made my recent Windows life a lot easier. FAST! makes everything appear faster."

On a standard Drive Evaluation Comparison test, FAST! increased performance over 1700% — and 550% over Windows' caching software!

Our Performance Benchmark...

The technicians at TigerSoftware tested FAST! by matching it against the power of the 386. They took an ordinary XT with a 10mb hard drive and loaded FAST! Alongside it, a Compaq 386, 25Mhz speedster. The task: transferring a few megabytes in a standard performance benchmark.

The XT with FAST! outran the Compaq by over 3 seconds! Here are the results:

Data Transfer Rates In Kilobytes Per Second

With FAST! vs. Without FAST!

Data Transfer Rates In Kilobytes Per Second

What Will It Take?

...To convince you that FAST! is the intelligent answer to the problem of sluggish processing? FAST! has topped our best-seller list for 9 straight months! Smart users everywhere have discovered this software that turns your system into a monster.

CLOSE-UP

"Disk-Caching"

FAST! uses a RAM management technology called "intelligent caching" to eliminate downtime from the central processor's performance.

Improvements in processor technology have brought about CPU's with blazing speed; however, their real performance is limited to that of the slowest component in the system. Floppy and fixed disk drives, which have much lower data transfer rates than the central processor, are notorious for the drain they impose on the overall system performance.

FAST! works by "uploading" data into a RAM cache before the CPU calls for it. While this RAM management technique is not unique to FAST! (in fact, it's been employed by mainframe applications for years), the particular genius of FAST! is its ability to find and load significant file data rather than merely reading in sectors of data randomly. This "intelligence" is the key to why it offers performance vastly superior to other caching software products.

FAST! also represents an alternative to hardware upgrades like turbo boards, enhanced processors, and high-speed drives, at a fraction of their cost. Given the virtually infinite combinations of hardware configurations and applications programs, FAST! will provide different performance enhancement specific to each situation.

You'll be astonished by the improvements in your desktop publishing, word processing, and graphics software performance. You'll find that any software runs faster with FAST!, even DOS. It also eliminates wait by saving files instantly to the RAM cache, downloading to disk only at opportune times, rather than holding up processing speed. And FAST! enhances even floppy-based systems, without hard drives. There's simply no better or more cost-effective way to enhance your system's speed.

FAST!

RY 3850 **FAST!** 5¼" **$79.95**
RY 3855 **FAST!** 3½" **$79.95**

FAST! will run on the IBM PC, XT, AT, PS/2 and compatibles with 128K RAM and DOS 2.1 or greater. Supports fixed or floppy disk systems, and supports conventional, expanded or extended memory.

TIGERSOFTWARE FREE FEDERAL EXPRESS TO ORDER 1-800-888-4437

Circle 259 on reader service card

The Intelligent Grammar Checker.

Runs from within 8 Word Processors for Clear, Powerful Writing.

In business, you're judged by what you say — and by how you write. Nothing can kill the confidence of a prospective customer or client faster than a proposal littered with grammatical, usage and punctuation errors. The fact is, there's no excuse for sloppy, error-filled written communication. Each letter, report, proposal, press release or other business document you prepare should represent you as a professional. That's what RightWriter is designed to help you do.

RightWriter Is the Premier Grammar and Style Checker for the PC.

It is designed to flag errors in your writing from a rule base of over 5,500 — including rules of grammar, style, usage, punctuation, sentence structure, subject-verb agreement and more. RightWriter produces a copy of the document and performs its analysis. Then displays (or prints) your document with flagged errors and explanations. These explanations are your guide to better writing. The result: clear, crisp documents that deliver your thoughts and ideas with maximum impact.

And RightWriter is the authoritative choice in grammar checkers, winning hands down in extensive testing against its competitor (see chart for results). After all, what good is a grammar checker if you can't really trust it?

Ideal for business and technical writing as well as education, RightWriter 4.0 is the easiest-to-use, most advanced grammar checker available today. Let's take a closer look at how RightWriter works...

How RightWriter Knows When Your Writing is Wrong.

RightWriter proofreads your documents using two artificial intelligence (AI) technologies called parsing and expert systems. Each technology has a separate, unique function, but together they rely on one another to identify parts of sentences and to locate errors.

Parsing performs the critical function of sentence dissection. It first identifies sentences' individual parts, breaking each sentence into major phrases and looking for both dependent and independent clauses.

Parsing goes further by identifying the subject and predicate of each clause and noting the word's part of speech. This technology, for example, can tell the difference between "can" used as a noun and as a verb.

The expert system relies on the parser to break down the sentences so it can determine their accuracy. Expert systems, unlike database and information retrieval systems, perform automatically. RightWriter's expert system examines your writing, judges the accuracy, and suggests improvements without your making any specific query.

RightWriter's 5,500 rule-based expert system deals with words, parts of speech, punctuation, and context to recommend changes to possible writing problems.

Now Runs From Within Eight Word Processors.

RightWriter's interface works within eight word processors: WordPerfect, LetterPerfect, Microsoft Word, WordStar, Professional Write, Q&A, Q&A Write and MultiMate Advantage II.

You use your word processor to create your document as you normally would. When you're ready to use RightWriter, you simply press a two-keystroke sequence. RightWriter will analyze the document and automatically bring marked-up copy on the screen. You have immediate and full editing control and can scroll back and forth through the entire document to make your changes.

RightWriter Uses 5,500 Grammar Rules to Check for 20,000 Errors.

- Subject-verb agreement
- Sentence fragments
- Run-on sentences
- Misused words
- Wrong verb forms
- Possessives
- Redundancy
- Capitalization
- Difficult sentences
- Split infinitives
- Long sentences and paragraphs
- Conjunctions
- Weak sentence structure
- Negative sentences
- Ambiguity
- Quotations
- Wordiness
- Missing punctuation
- Slang

Version 4.0 Features:

- *Customize RightWriter to your personal writing style — or select from 5 automatic settings.*
- *Inserts messages directly into the text to point out problem areas in letters, proposals, reports.*
- *Now runs from within 8 word processors: WordPerfect, LetterPerfect, Microsoft Word, WordStar, Professional Write, Q&A, Q&A Write and MultiMate Advantage II.*
- *Indexes measure strength of delivery, readability, use of adverbs, adjectives, jargon.*
- *Will instantly spot over 20,000 errors!*
- *New Menu System allows you to customize RightWriter to meet your particular needs.*

RightWriter vs. The Competition.

Researchers at Michigan Technological University tested the three IBM PC-based grammar and style checkers. The following is an excerpt from the letter which accompanied their findings...

"We've finished our independent tests comparing the performance, accuracy and usefulness of RightWriter 3.1, Grammatik and Perfect Grammar on two separate documents: one ("Testbed") that you have sent to us and another ("Ties") that we selected independently.

As you can tell from just a quick glance at the enclosed tables, RightWriter impressed us as far as style-analysis programs go: RightWriter correctly flagged 176 errors (with a total error rate of only 8 percent) in an essay that saw more than twenty major revisions.

RightWriter has such a low error rate that the program rewards users instead of overwhelming them. RightWriter's manual was also both easier to read and more informative than either Grammatik's or Perfect Grammar's. Finally, RightWriter's problem explanations form a good refresher course in grammar and style.

Sincerely, Dr. Cynthia L. Selfe."
Associate Professor, Humanities Department
Michigan Technological Univ., Houghton, MI

Which Would You Trust?

Test Document 1	RightWriter	Grammatik IV
Total Flags*	**4124**	1290
Correct Flags*	**4065**	1118
Incorrect Flags**	**59**	172
Error Rate	**1%**	13%

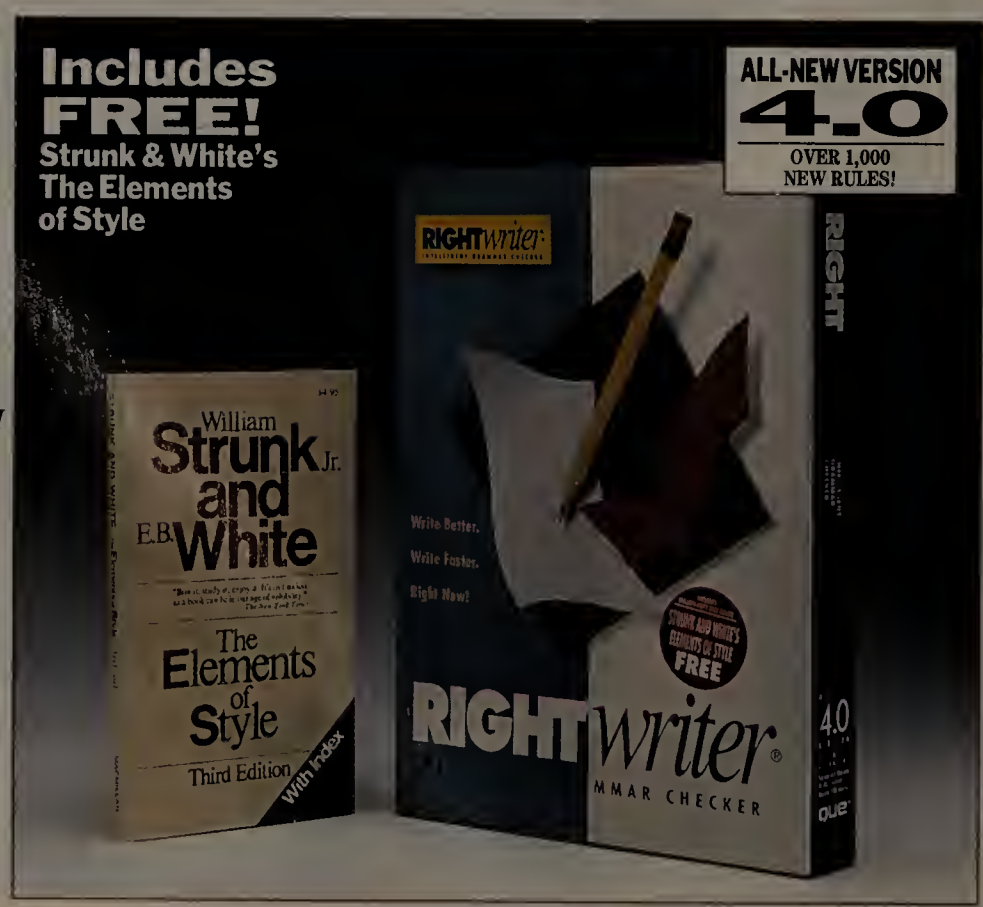
Test Document 2	RightWriter	Grammatik IV
Total Flags*	**201**	182
Correct Flags*	**174**	118
Incorrect Flags**	**27**	64
Error Rate	**13%**	35%

**A higher value is better. **A lower value is better.*

TEST NOTES: *Flags were identified as "incorrect" if the program suggested textual changes where none were required or each time a program flagged a compound adjective as possibly mispunctuated when the word was punctuated correctly. Test document was supplied by RightSoft.*

Compatible With These Word Processors:

Bank Street Writer®
DeskMate Text
Edix/Wordix®
Enable®
HomeWord II®
IBM Writing Asst.®
Leading Edge®
Microsoft® Word
Microsoft® Word for Windows
Microsoft® Works
Microsoft® Write
Multimate Adv.® I & II
Multimate®
New Word®
Office Writer®
PC-Writer®
PeachText® 5000
pfs: Write®
pfs: Prof. Write®
pfs: First Choice®
Q&A Write®
Samna®
SideKick®
VolksWriter® (Deluxe, Plus & 3.0)
WordPerfect®
WordStar®
WordStar 2000®
XyWrite®



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RIGHTWRITER 4.0

RY 2860 **RightWriter** 5¼ & 3½ (Dual)	**$79.95**
RY 2870 **XENIX/UNIX**	**$295.00**
RY 2540 **Mac Version**	**$79.95**
RY 2550 **Network 5 Pack**	**$299.00**

IBM PC, XT, AT and compatibles with 512K. Hard disk or floppy.

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Circle 259 on reader service card

How Do You Fill In Pre-Printed Forms?

Eliminate One Of The Office's Most Time-Consuming, Tedious Tasks.

Are you still filling in insurance forms, legal and tax forms, government forms, invoices, medical and Federal Express forms by hand? Or struggling through the trial-and-error nightmare of using a typewriter? The fact is, filling in pre-printed forms is a classic example of inefficiency, with a high margin for error. The PC can be a great assistant in filling in forms, and FormFiller 3.0 is the premier forms fill-in software for even the most complex multi-page, multi-part, and double-sided forms.

FormFiller 3.0 actually synchronizes your computer printer (a critical first step), to locate blanks and place information on the form with pinpoint-precise accuracy, and it works with virtually any dot-matrix, daisywheel or laser printer. This powerful software streamlines data entry with a host of on-screen guides and error-checking features. These features not only speed the process, but virtually eliminate errors as well — errors that can be very costly. Along with FormFiller 3.0's extensive data validation features there's plenty of fully context-sensitive help available for any function.

With FormFiller 3.0, you can decide the order in which the blanks should be filled in, give certain areas color codes for fast visual recognition, include non-printable notes to instruct data entry, "lock" certain information into the form so it won't have to be manually entered each time the form is filled out. You can also quickly set up FormFiller 3.0 to import and automatically fill-in forms directly from your database, and "batch print" your forms.

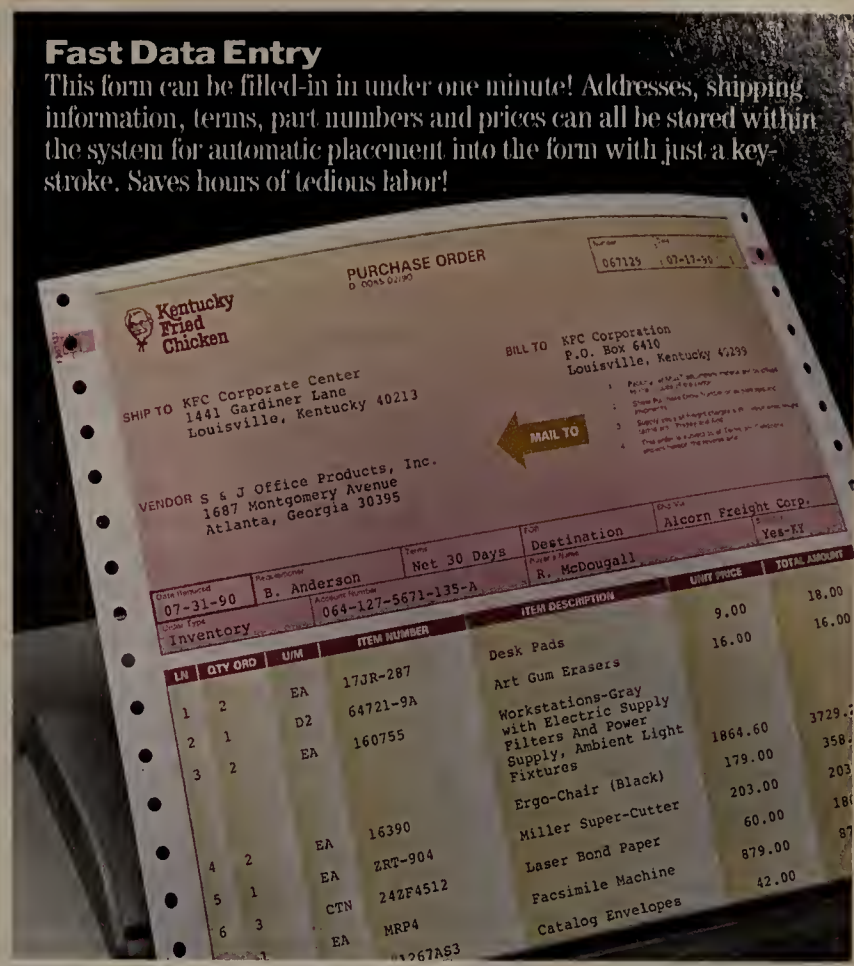
The system doesn't stop there. It contains a complete set of financial and mathematical functions that you can easily assign to particular blanks to perform a specific calculation whenever value is entered. Or you can automatically perform a series of calculations on a series of numbers. For example, you could quickly instruct FormFiller 3.0 to calculate the extended prices of all items listed on an invoice, total them, deduct a discount, figure and deduct taxes and calculate the final total. There are over 40 math functions in all, including amortization, interest, present and future values, depreciation, percentages — dozens of others!

There's more! FormFiller 3.0 includes a unique "Look-up" feature that stores pieces of information and automatically places them into position with just a menu selection. Part numbers, shipping and billing addresses, names, phone numbers, account numbers, payment terms and hundreds of other details can be organized and stored and retrieved anytime — without looking for them or retyping them. In addition, FormFiller 3.0 allows you to control exactly HOW the data is to appear and be printed. For example, negative numbers can be entered and automatically appear and print in parentheses. Enter a series of 10 digits into a specific field and FormFiller 3.0 displays them as an area code and telephone number, or make the data entered into certain spaces on the form automatically print bold.

This all means that a form that may have taken fifteen or twenty minutes to fully complete (possibly containing errors), now may require as little as one minute to fully complete, including a check for errors and omissions. The form appearing on this page was filled in using FormFiller's advanced fill-in, Look-up feature and math capabilities in under one minute. Businesses of all sizes can use the ease and power of FormFiller 3.0 to make extremely light work of a difficult, awkward chore.

FormFiller 3.0 can, in fact, slash the fill-in time required for any form by as much as 80 percent. By creating a "master template" of the form, FormFiller 3.0 can match any spacing, even if the spacing changes throughout the form or is inconsistent from line to line. Data entry is as easy as tabbing from blank to blank, with so much of the tedious work removed from the process that filling in forms isn't the messy, time-consuming project it once was.

FormFiller 3.0 actually contains two distinct programs. Designer, which actually allows you to create templates to your exact requirements, and Filler, which can be used by data entry personnel to display the form, fill it in and print it.



Features:

- Accurately fills in any form, including multi-page/multi-part forms.
- Place data precisely onto form, match any spacing.
- Guide data entry with on-screen instructions.
- Perform dozens of math functions within the form.
- Great for insurance, medical, legal, government and tax forms, invoices, shipping airbills.
- Automatically looks up and fills in frequently-used details for you.
- Separate Designer and Filler Programs.
- Import data from your database or spreadsheet directly into your forms.
- Use data from dBASE II, dBASE III, Lotus 1-2-3 (WKS and WK1 formats), DIF and ASCII.
- Dramatically reduce costly errors during data entry and form fill-in time.
- Automatic data formatting for speedy data entry.
- Supports up to 640 fields per page.

How FormFiller Works:

Step 1 — *Insert The Form Into Your Printer.*

The secret to FormFiller's power is its ability to tightly synchronize the computer and printer for precise positioning. You begin by creating a template for each form, matching the exact spacing, position and size for each field or blank on the form and inserting captions and fill-in instructions if you like.

Simply insert a sample form into the printer, with the system prompting you for alignment with your printer head. You then invoke FormFiller's "print grid" command. This actually prints vertical and horizontal lines directly on the pre-printed form, with numbers along the top and the left margin. This grid, and the corresponding numbers, are your guide in establishing the coordinates for each print position on the form.

Step 2 — *Locate Precise Print Positions.*

Using FormFiller's new menu-driven interface, the next step is to create exact print positions for each blank on the form. It's fast and simple — just two keystrokes are required to establish a print position, defining it from starting point to ending point. And FormFiller allows you to adjust your print positions in any direction in increments of up to 1/720th of an inch for pinpoint-precise alignment. You can quickly create custom grids for complex or inconsistently spaced forms.

Step 3 — *Preparing the 'Master Template.'*

Once the coordinates for each print position on the form have been entered, you then enhance the "master template" for the form.

Step 4 — *Swift, Simple Data Entry.*

The master template for each form is stored for instant call up and fill-in anytime. FormFiller allows data to be entered into templates using any format: columns, prompts, or into the actual form image. The data is then automatically transferred to exact blank positions on the pre-printed form.

BLOCPublishing

FORMFILLER 3.0

RY 8002 FormFiller 3.0 5¼" & 3½" $149.00

IBM PC, XT, AT, PS/2 or compatibles with 512K, DOS 2.0 or greater and one floppy drive and a hard disk. Supports virtually all printers. Includes "The FormFiller Sampler"— sample templates, user guide and help cards.

TIGERSOFTWARE FREE FEDERAL EXPRESS TO ORDER 1-800-888-4437

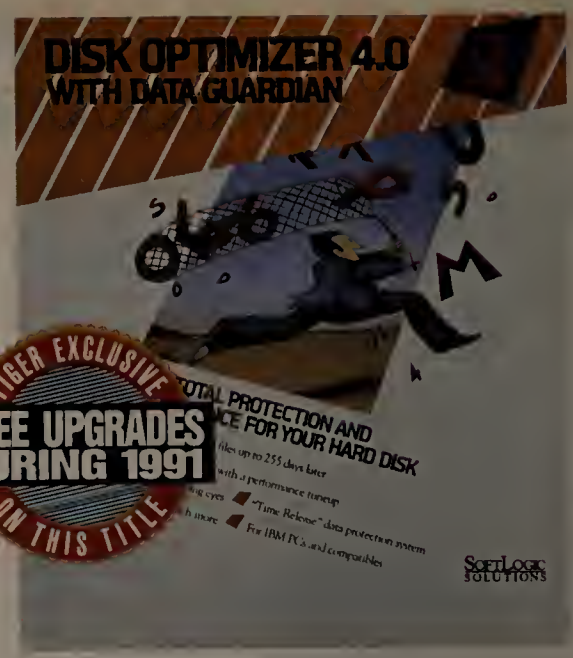
Circle 259 on reader service card

Avoid Hard Disk "Heart Attack."

Fragmentation is Inevitable and Fatal!

When your hard disk was new, it ran lean and swift, retrieving files in just a few seconds. But as you added programs and files, your hard disk became fat and sluggish. The fact is a fragmented, "dirty" hard disk can take up to 100 seconds to retrieve a file that used to take 10 seconds — ***that's 10 times slower!***

The problem? Fragmentation kills hard disk performance. It causes excessive head movement across the media, creating bad spots throughout the drive. It's aggravating and dangerous! A fragmented hard disk, left unmaintained, is almost certain to crash. That means major data loss. Disk Optimizer 4.0's sleek, *easy-to-use menu system* makes hard disk maintenance simple.



Here's How Disk Optimizer Helps You Avoid Disaster!

1. The New Hard Disk.
This is a brand new hard disk. As you begin to create files, they are stored on the disk randomly. Each occupies a place on the sparsely-populated disk. At this point, disk performance is at its peak. A 256K file or program can be retrieved in just a few seconds. Wear and tear on your equipment is minimal.

2. Fragmentation Begins.
As you edit these existing files, DOS will store your additional data in the same random manner. If you delete a file, a "hole" is left where that file had been stored. DOS will fill that hole with parts of other files. Fragmentation has begun. Your hard disk is running considerably slower.
More and more files are added, edited and deleted. There are pieces of your files and programs scattered all over the disk. Your hard disk's head spends more time "dragging" across the surface of the disk, endangering the media — and the data. Under normal circumstances, the risk of a hard disk crash is high, and the wear and tear on your disk's moving parts and magnetic media is severe. And it's slower than ever!

3. After Using Disk Optimizer.
Disk Optimizer assembles the pieces of your fragmented files and stores them as ONE FILE. Just a couple of keystrokes will help your hard disk run up to 300% faster! All your data is 100% safe. And *your hard disk is safe. Disk Optimizer contains features such as "Data Guardian," that recover files and unformat accidentally formatted hard disks — plus a dozen new utility features.*

Who Needs Disk Optimizer?

Simply everyone who owns a hard disk, and relies on the speed and convenience it gives them. But unfortunately, DOS is doing its best to slow hard disks — by breaking files up into pieces. Storing different chunks in different places. As a result, loading is slower. Sorting is slower. Everything takes longer because your hard disk has to chase around picking up and laying down pieces of your file.

After un-fragmenting with Disk Optimizer, a file that once occupied 20 different sectors in 20 different locations is now in one contiguous piece. The next time your drive reads it, there's just one place it has to look. Performance times may be cut by as much as two thirds!

Absolutely Disaster Proof.

Nothing *can* go wrong, even if you yank the plug from the wall in the middle of the program. Only Disk Optimizer is designed to copy each file, piece by piece, then thoroughly check the un-fragmented version for completeness and integrity. *Only* then does it erase the fragmented version.

SOFTLOGIC SOLUTIONS

DISK OPTIMIZER

RY 3280 **Disk Optimizer 4.0** 5¼" **$69.95**
RY 3285 **Disk Optimizer 4.0** 3½" **$69.95**
Runs on IBM PC and compatibles. Supports DOS 2.1 and above.

Automatic Protection Against Power Failures.

Better Than a UPS. Automatically Saves and Shuts Down Your System.

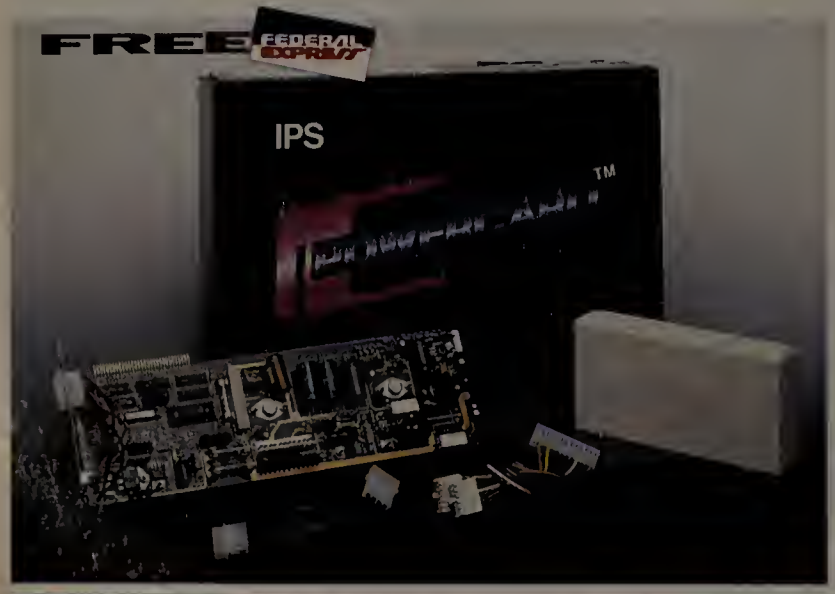
You already know the necessity of a backup power supply. Power failures and brownouts are a major cause of corrupted files and permanent hardware damage. A slight drop in power (brownout) can actually unbalance and burn a computer's components. A power failure can do more than just lose your work since your last save; it can corrupt large files like spreadsheet and database files beyond repair.

Better Than A UPS...

A UPS (Uninterruptible Power Supply) is not exactly user-friendly. When your building loses power, things get frantic. The room is dark, people yell, some get frightened, and the alarm on your UPS screams to let you know you have 5 minutes to safely finish what you're doing (can you finish in time?), then close your files and safely shut down your system. And that's assuming you're at your computer when the lights go out. This is not the time for cool, collective thinking. Things are frantic! Chances are, this is when you make that costly mistake.

Powercard To The Rescue!

With Powercard safely installed inside your computer, you're protected and have nothing to worry about. Powercard automatically freezes everything you're working on and safely shuts down your computer. Nothing lost. Everything saved. In fact, since there's nothing you need to do, you can feel safe every time you walk away from your computer — knowing nothing will be lost.



So Easy, You'll Use It Daily.

Powercard is more than total protection against power failures and brownouts — it's a new way to turn off your computer. Tomorrow you can start right where you left off, in the middle of Lotus 123, WordPerfect, SideKick, or whatever your favorite program. If you want to turn off your computer for reasons of privacy, lunch, or even just a coffee break, when you come back switch it on and pick up where you left off.

Powerful.

The Powercard's strong 180-watt output capacity means it can be installed in virtually any PC regardless of size or type. And the advanced power storage can protect you from 10-30 shutdowns per day. After a restore, Powercard automatically re-enables itself, immediately protecting you from another shutdown.

Good News For Power-Users...

Powercard doesn't use any of your memory. It uses no device drivers, TSRs, extended or expanded memory. The Powercard has its own memory on the board. As far as the operating system is concerned, the Powercard is totally transparent. Powercard supports a wide range of operating systems, from DOS to network workstations.

POWERCARD™

POWERCARD

RY 6910 **Powercard** 5¼" **$299.00**
Requires hard disk, 5¼" drive, 1½ full-size slots. (3½" disk avail.)

TIGERSOFTWARE FREE FEDERAL EXPRESS TO ORDER 1-800-888-4437

Circle 259 on reader service card

Now You Can Download Reports from Any Mini or Mainframe and Bring the Data Alive on Your PC!

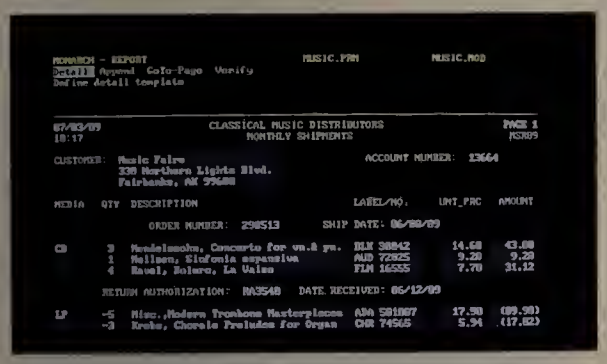
Mini or Mainframe Data, Tamed and Tailored for Your PC!

Monarch Reads Report Files, Extracts the Data, and Gives It Back to You Formatted Any Way You Want.

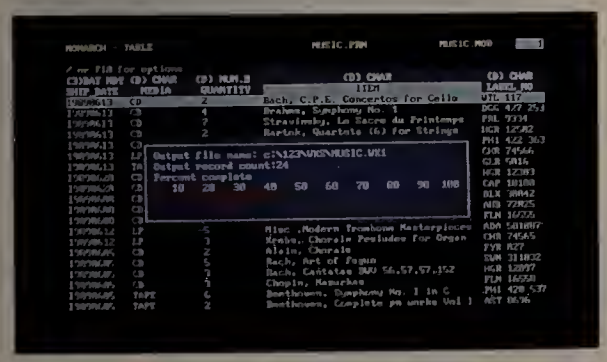
Consider for a moment the vast ocean of information that governments, corporations and other organizations accumulate, store and manage. The sheer volume of information demands a mainframe or mini-computer for data storage. But here's the paradox: All the best tools for data analysis are on the PC. PC users who need to get their hands on the data cannot gain access to it. They must sift through stacks of printed reports to find what they need. Now, there's a powerful new tool to help PC users bridge the data gap.

Existing Reports Become Valuable, Ready-Made Databases.

Monarch reads report files, extracts the data, and gives it back to you formatted any way you want! To understand the magic of Monarch, picture all the reports that come across your desk. All those cost summaries, transaction reports, customer lists, asset schedules, payroll reports and more. Think of flipping through all those pages trying to understand what's going on. Imagine trying to re-key all that data into your spreadsheet for analysis. With Monarch, the data comes alive.



Monarch reads report files and extracts the data. Here, the extraction template overlays the report.



The data is assembled into records, selected, summarized and sent out to Lotus 1-2-3.

Monarch can read reports downloaded from a mainframe or mini-computer, or produced on a PC. It extracts data from the report file and lets you see it, sift it, select it, summarize it and send it out to your spreadsheet, word processor, graphics package or database manager.

Monarch can read any computer-generated report stored on disk. These files are variously known as RPT files, TXT files, formatted ASCII files, PRN files, SDF files, etc.

Why Read Report Files?

Computer-generated reports are the life-blood of modern business. Monarch's ability to read report files, extract data, and then manipulate and analyze the results, make all your existing reports more valuable than ever before.

Monarch can read ASCII reports generated in nearly all computing environments, including IBM, HP, DEC, NCR, Unisys, Wang, Prime, ICL and many others.

CASE STUDY: Monarch Eliminates Re-keying Data.

Suppose you've got a 500-page customer activity report that's been downloaded from your company's mainframe. You've been asked to analyze sales trends, but you don't want to spend hours digging through the printed report. Monarch allows you to automate the analysis by turning the report into a live database.

Here's how it's done. Simply load the customer report file into Monarch, quickly define a data extraction template, and then explore the report using powerful data analysis commands.

You can tell Monarch to show you all the sales transactions for a particular customer, product, salesman or region. Then produce crosstab summaries that show the field totals and record counts broken out in a variety of useful formats. Data and reports can be output on a printer, or exported to applications like Lotus 1-2-3.

CASE STUDY: Adding Flavor to "Plain Vanilla" PC Reports.

In the PC environment, accounting systems aren't very adept at producing anything but "standard" reports. Monarch makes accessing and analyzing this information fast and simple. Monarch will actually capture a report while it's being printed, extract the data, and reformat it according to your particular specification.

"Monarch is the slickest thing I've seen in a long time. It has already saved me lots of sweat and toil and enabled me to work smarter.

—Bob St. James, Loctite Luminescent Systems, Inc.

"I am so reliant on Monarch that I cannot imagine what my job would be without it. I now have time to work smart instead of just working hard. Monarch is a truly remarkable product."

—Andre Audant, Guilford Mills

BONUS!

FREE UltraVision When You Buy Monarch.

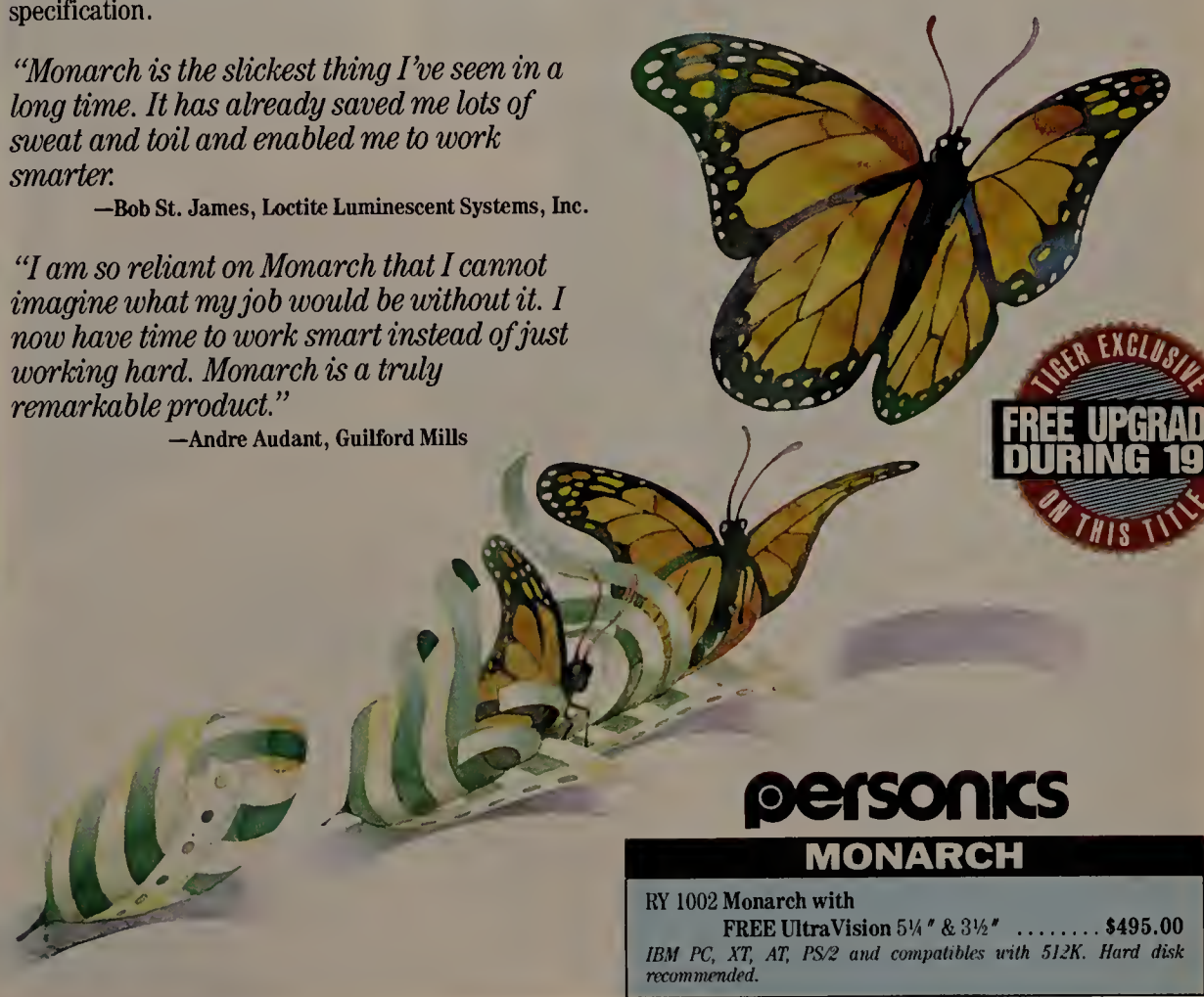
UltraVision Unlocks the Hidden Power of Your Display!

Are you using the full capabilities of your display? Probably not. The fact is, today's EGA and VGA systems possess extensive capabilities that remain hidden from most users. UltraVision fills the video support gap by giving your application software the ability to fully exploit your video hardware.

UltraVision gives you complete control of your video environment. It allows you to completely control screen colors, load alternate screen fonts, and enjoy unmatched image clarity and crispness on VGA monitors and multiscanning EGA monitors.

View a Full 132 Characters Across!

UltraVision also lets you see more than 80x25 characters on screen in a host of popular applications, including Monarch. Expanded screens are especially helpful when you want to see a 132 column report in Monarch without scrolling left and right. All 132 columns appear on screen!



personics

MONARCH

RY 1002 Monarch with
FREE UltraVision 5¼" & 3½" $495.00

IBM PC, XT, AT, PS/2 and compatibles with 512K. Hard disk recommended.

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The Razor-Sharp *800 dpi* Hand Scanner!

Unmatched Resolution in 64 Levels of Gray that Fits in the Palm of Your Hand!

Imagine an instrument that you can quickly pass over a graphic image, logo, design, drawing, chart, photograph — and instantly capture it to your computer screen — in ultra sharp 800 dots per inch resolution! 800 dpi means crisper, cleaner, more highly detailed images for use in desktop published documents, reports, proposals, newsletters, flyers, and brochures. And with 64 gray scale levels, a host of special effects and 12 halftone patterns built right in, controlling the look of the image is simple — and fun! The images you scan will reproduce as if they were originals, and they can be stored in TIF, PIX, PCX, CUT, IMG and MSP formats.

Or imagine simply scanning text from printed pages, magazines and books — no more re-keying! The Marstek M800 hand scanner delivers unmatched resolution for precise character recognition regardless of the type style or size and even includes free optical character recognition (OCR) software to turn the scanned text into ASCII — ready to use in your word processing or desktop publishing application. And the whole system is ready to run right out of the box. The installation is fast and easy, the technology is simply amazing.

Marstek's advanced design and superior technology works seamlessly with virtually any application. Quickly scan the image you want, size it and crop it for perfect positioning. Or let your creativity run wild and use the included tools to "play with" your scanned images, reversing them (to produce a white image on a black background), editing pixel-by-pixel, easily employing powerful special effects and merging the images with text.

Here's What You Get...

The Marstek M800 Hand Scanning unit with a handsome, durable shell, and the easy-to-install interface card for your computer. You'll get the ScanKit Utility Software Disk and a comprehensive User's Guide. Plus! Tiger throws in the best-selling paint program PC Paintbrush Plus and Mars Pro Reader OCR absolutely free.

Using PC Paintbrush Plus, you can enhance your images, add colors and create hundreds of creative variations featuring the industry's most extensive electronic palette. The Pro Reader OCR software allows text scanning quickly, easily and more accurately. That's hundreds of dollars in free software from Tiger.

The Marstek Family Of Mice.

The Marstek Mice are designed for higher performance. They're 100% Microsoft compatible and impeccably accurate — but they come with a surprisingly modest price tag. The Marstek mice are known for accuracy. In fact, we tested the Marstek Mice (E22 and P93 models) for accuracy and speed against other leading nameplates, and it equalled or outperformed the Microsoft Mouse, Logitech's Series 9, and several others. The secret is in the outer shell design and durable construction. The award-winning design allows for high efficiency hand movement, so it takes less actual "push" to move the pointer around the screen. You'll notice a silkier movement and an increased feeling of control the very first time you use it. The Marstek E22 and P93 also feature buttons with firm, clean clicks. A far cry from the "mushy" buttons you find on other mice, great for fast, rapid-fire computing.

100 Dots Per Inch

400 Dots Per Inch

800 Dots Per Inch

BONUS!

Free When You Buy the Marstek 800 Hand Scanner.

Mars Pro-Reader OCR Software — This package allows fast, easy optical character reading (OCR) for text pages. Eliminate re-keying of text!

PC Paintbrush Plus — One of the industry's most respected and capable paint programs.

Free when you buy a Marstek Mouse! *When you purchase the Mars P93, you'll receive free a mousepad and desktop publishing software. The P93 also includes PC Paintbrush Plus.*

Marstek

MARSTEK SCANNER/MICE

RY 1830 Mars 800 w/CAT Reader OCR and PC Paintbrush Plus	$279.00
RY 1820 Mars 800 w/CAT Reader OCR and PC Paintbrush Plus and E22 Mouse	$299.00
RY 1840 Mars Mouse E22	$49.00
RY 1860 Mars Mouse P93	$99.00
RY 1870 Mac 800 Scanner (for Macintosh) w/FREE Enhance	$399.00

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Circle 259 on reader service card

Pack More Data onto Less Disk Space!

Get up to Twice the Capacity from All Your Storage Media.

You know what happens. The more you use your computer, the more information you create. And the faster you fill up your disk.

The 10 MB drive that once seemed enormous is now jammed with important files. That 20 MB that should have lasted years is crowded in a matter of months.

Of course, you could always go out and buy a bigger hard drive. Or you could get Cubit. It's the remarkable new software designed to squeeze the maximum usable storage space from your hard disk, as well as your floppies and tape cassettes.

Use Cubit, and a word processing file that once took up 20K now takes as little as 10K. The archival records you use to keep on floppies now stay right on your hard drive, providing instantaneous access in a minimum of precious space.

What is CUBIT?

In brief, Cubit is an advanced software tool that automatically reduces the number of bytes required to store a file, then converts the file back to its original size when retrieved. It's sort of like taking the air out of a spare tire while it's in your trunk, then reinflating it when you need it.

Some programmers call this effect "data compression," others "disk expansion." Either way, the result is the same. All your magnetic media is made to store information in the most efficient and economical way possible. Regardless of the form your data takes.

How Much Disk Space Will You Save?

The vast majority of data created on PC's is standard ASCII text — letters, numbers, punctuation and other English language symbols. You can expect excellent performance with all kinds of data. Including spreadsheet files, program code, graph and image files, even binary data.

Storage Media Compatibility.

Cubit's storage expansion capability is identical whether it's used with hard disks, floppy disks, streaming tape cassettes or standard data cassettes. Original storage capacity of media is not a factor.

Pop-Up Cubit at Any Place... at Any Time.

Once a file is compressed with Cubit, it automatically decompresses when you use it, then automatically recompresses when you're finished.

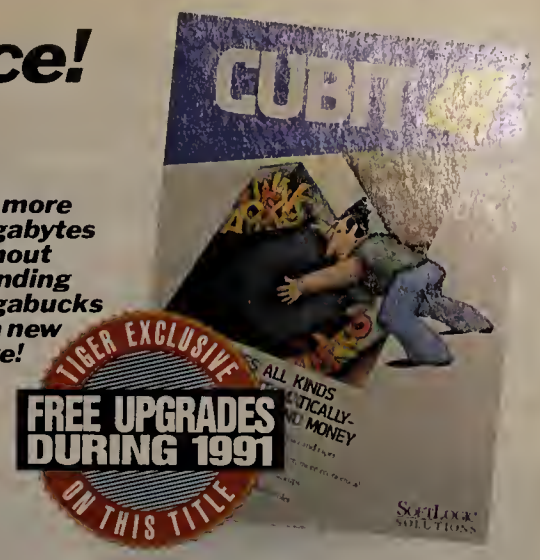
Cubit works with all magnetic media, including hard disks, floppies, and tape cartridges. And Cubit is ideal for long term archival storage.

Compatible with All Software.

Cubit performs smoothly with all kinds of data — particularly text files and databases. But, now Cubit is an effective software product for compressing your Lotus worksheets.

Cubit achieves an average of 70% compression for both Lotus 1-2-3 and Symphony files. Cubit can, in effect, turn your 20 megabyte disk into a 60 megabyte disk! And, Cubit is the only product we tested that can compress all files — not just Lotus files.

Get more megabytes without spending megabucks on a new drive!



Technical Features:

- Reduces 1-2-3 worksheet files by an average of 70%.
- Reduces word processing and text files by an average of 55%
- Reduces data base files by an average of 45%
- Reduces program and other binary files by an average of 25 to 35%
- Compresses files that are greater than one disk cluster (typically 2K-4K) in length
- Reduces transmission time and line charges for telecommunications applications

SOFTLOGIC SOLUTIONS

CUBIT

RY 3310 **Cubit** 5¼" **$59.95**
XG 3315 **Cubit** 3½" **$59.95**
IBM PC, XT, AT, Compaq and other closely compatible microcomputers. PC-DOS/MS-DOS 2.0 or higher, 128K RAM.

A Major Astronomical Discovery!

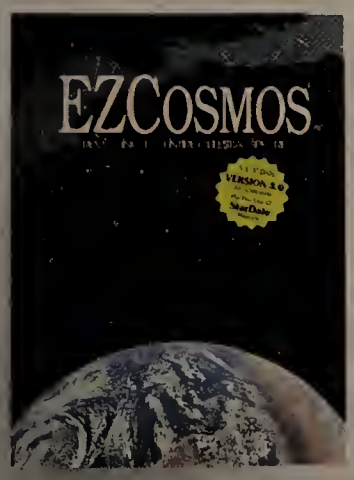
EZCosmos Puts the Entire Universe at Your Fingertips.

TIGER EXCLUSIVE FREE UPGRADES DURING 1991 ON THIS TITLE

Throughout the history of mankind, the heavens have captured the imaginations of thinkers and scientists. In 1609, Galileo perfected his telescope's lenses and saw for the first time Jupiter's four moons. In 1671, Sir Issac Newton created the revolutionary reflecting telescope and a new age of astronomy was ushered in. Today, NASA probes and enormous land-based observatories provide a broad understanding of our universe.

See the Stars as the Romans Did...

Now you can have the astronomical knowledge of the centuries right on your PC with new EZCosmos. Whether you're a casual observer, aspiring stargazer, or professional astronomer, you'll find EZCosmos an exciting and complete reference tool. Using its unique SkyPlot feature, EZCosmos will quickly display the entire celestial sphere for any date, time and location you specify from 4000 B.C. to A.D. 10,000. You can select from a host of unusual celestial events, like the upcoming solar eclipse as seen from Hilo, Hawaii, which will occur on July 11, 1991. Or select from 1,100 cities around the globe and instantly see what the sky looks like at any time. Great for the entire family, and a wonderful educational tool for students. EZCosmos is also an excellent system to aid in navigation.



Animate the Sky!

Select a sky for viewing and you can create an animated sequence that shows the planets' rotation over a specific period: one minute to 9,999 days.

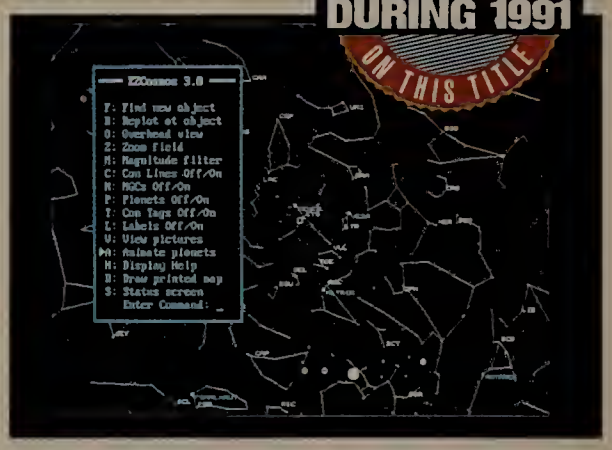
What Can I See?

EZCosmos is like a planetarium on a disk. When you select a view, the sky is automatically plotted, displaying the sun, moon, planets, stars, constellation lines and more. Use the box cursor to select objects on your screen and view its constellation name, common name, rise and set times altitude and azimuth, right ascension and declination and magnitude.

EZCosmos is so simple to use, you'll have hours of fun exploring other galaxies, solar and lunar eclipses, phases of the moon and its progression through the sky. You can zoom in to any constellation to study it in more detail, zoom out for color photos of the Milky Way, Andromeda and other galaxies.

Features:

- Skyplot for any location on the planet from 4000 B.C. to A.D. 10,000.
- 1,100 cities to choose from or input your own latitude and longitude.
- The sun, moon, planets, stars, constellations and NGC (New General Catalog) items are displayed.



The SkyPlot displays the stars in their spectral colors. Easy-to-use pop-up menus makes EZCosmos fast and fun to use.

- Select any object with the box cursur for easy identification.
- Quickly find any item by its common name or its constellation designation.
- Restrict skyplot using the magnitude filter to display the actual overhead view or the navigational stars.
- Watch accurate solar eclipse animations.
- View the phases of the moon.

Future Trends Software
P.O. Box 1418 • DeSoto, Texas 75115 • 800/ 869-3279

EZCosmos

RY 2120 **EZCosmos** 5¼" **$69.95**
RY 2125 **EZCosmos** 3½" **$69.95**
IBM PC, XT, AT; 512K RAM, VGA, EGA, CGA or Hercules monitors supported.

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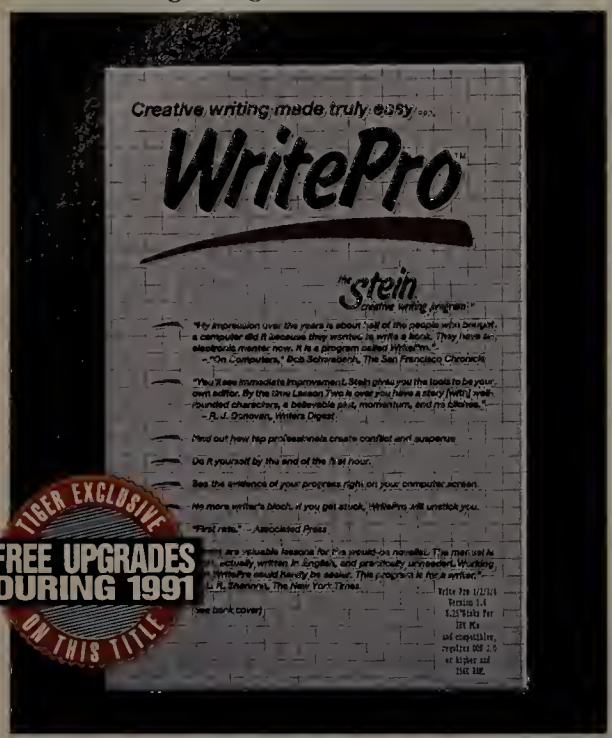
The Critically Acclaimed Creative Writing Tool For The PC.

The Direct, Intuitive, Interactive System From Sol Stein.

How do professional writers create conflict and suspense? How do you develop believable characters, unfold an engaging plot and create increasing momentum for your readers? How do you hook the reader's attention and write exciting dialogue?



Introducing WritePro, an innovative tool with a treasure chest of professional craft techniques for developing your creative writing skills. It's used by published novelists and ambitious beginners, by teachers, students, lawyers, judges, generals, advertising copywriters, and others. No more endless trial and error. No more writer's block. If you get stuck, WritePro will unstick you. WritePro's lessons stimulate your imagination. You see evidence of your improvement right on the computer screen. WritePro's built-in word processor saves your writing automatically.

This easy-to-use system has been selected by the Literary Guild and recommended by members of the National Writer's Club.

WritePro's creator Sol Stein is a seasoned, prize-winning pro with nine novels and a million copy seller to his credit. He guided Academy Award-winning Elia Kazan to a 3,000,000 copy sale on his first book and then three best sellers in a row. Stein edited seven Jack Higgins novels with average earning of nearly $2,000,000 each. Now Stein can be your tutor.

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"These are valuable lessons for the would-be novelist. The manual is short, actually written in English, and practically unneeded. Working with WritePro could hardly be easier. This is a program for a writer." —***The New York Times***

"Now there's a creative-writing program that will teach you as much as anyone can about how to be a novelist.... The program will work for writers other than aspiring novelists; the principles of good writing are good for all kinds of writing."
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IBM PC, XT, AT and compatibles with 512K.

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AccuWeather Brings You Weather Updates and Forecasts Via Modem!

You can't change the weather, but you can get timely forecasts and radar screens to see exactly what it's doing with new AccuWeather. With AccuWeather, your PC becomes a personal meteorological information service, providing data for the nation and the world. Using your modem, you'll access the same information source that radio and television stations use to prepare their broadcasts.

The screens you'll see are used by weather professionals who depend on precise, up-to-the-minute information that only AccuWeather can give. And now you can have a direct line to this same information.

AccuWeather features colorful, detailed screens like the ones on this page. The color-enhanced maps display current precipitation, temperatures, moving fronts, cloud cover, lightning, complete hurricane tracking sequences, jet stream movement, freezing levels, even soil temperatures and surf conditions. AccuWeather is fast and easy to use, employing simple menu commands.

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As Much Detail As You Want!

What's the weather like in Paris, Tokyo, Rome, Sydney, or Moscow? A menu selection displays complete information in seconds. Need highway reports, marine or aviation conditions? AccuWeather provides fast, accurate forecasts including freezing levels and off-shore data. AccuWeather also includes agricultural outlooks and extensive climate statistics.

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AccuWeather allows you to easily print the maps and radar shots that are displayed on screen. In the event of a hurricane, printing AccuWeather's hurricane tracking maps can produce a complete history of the storm's movement.

Up-to-the-minute maps with information on temperature, precipitation...

...Jet stream, freezing levels and more!

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RY 1009 **AccuWeather** 5¼" & 3½" **$89.95**
IBM PC, XT, AT. Requires modem.

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Finally. A *Fully Automatic* Memory Manager.

30% Faster — Improves Windows 3.0!

Fully Automatic Memory Manager and Program Leader.

Congratulations! You own one of the hottest computers around. But do you use it the way you should? Do you take advantage of its incredible capabilities? Are you confused by all the types of memory, not knowing what program needs what kind of memory or how to provide it? Then 386MAX is your solution. 386MAX takes charge of your computer's memory so you get right to your favorite application.

Speed Is the Key.

386MAX is the ultimate memory manager for today's 386 and 486 hi-tech computers. And best of all, hi-tech doesn't mean highly complicated. 386MAX automatically analyzes and configures your system for maximum performance and efficiency — from making utmost use of your extended memory — to providing Expanded Memory and/or XMS memory to programs that need it — to loading your pop-up utilities and network drivers above the 640k area. And it's 30% faster than previous award-winning versions!

PC Magazine said when awarding 386MAX their "Editor's Choice" award, ***"For owners of 386 PCs, 386MAX is surely the utility of the year."***

PC MAGAZINE EDITOR'S CHOICE

Windows Users...

386MAX is the perf_ct partner for Windows 3.0. Your Windows applications get all the memory your system has to offer — *plus* any programs you run out of Windows (straight from DOS) get the Expanded Memory they need! You get the best of both worlds!

If you run pop-up utilities, like Sidekick, you can now run them reliably in Windows — thanks to a special feature of 386MAX that allows many TSRs to appear more than once in multiple windows!

Effortless Installation...

Industry writers are raving! "Qualitas has made the installation of the program childishly simple, with sensational results."

Jim Seymour, PC Week

If you've tried other memory managers, you know the nightmare of installing one. Figuring out how much memory is used by hot-keyed Terminate and Stay Resident (TSR) programs when they actually run, how much memory they need to just load, where to relocate them in other parts of unused memory above 640k can make one pity the Minotaur trapped in his maze.

BlueMAX for the PS/2.

"For PS/2 systems... BlueMAX is the overwhelming choice because it can produce much more usable high DOS memory."

Ted Mirecki, PC Week

The *only* memory manager designed specifically for 386 PS/2's — BlueMAX's proprietary technology recovers 80kb more memory than any other memory manager. Run your IBM Blue to the MAX.

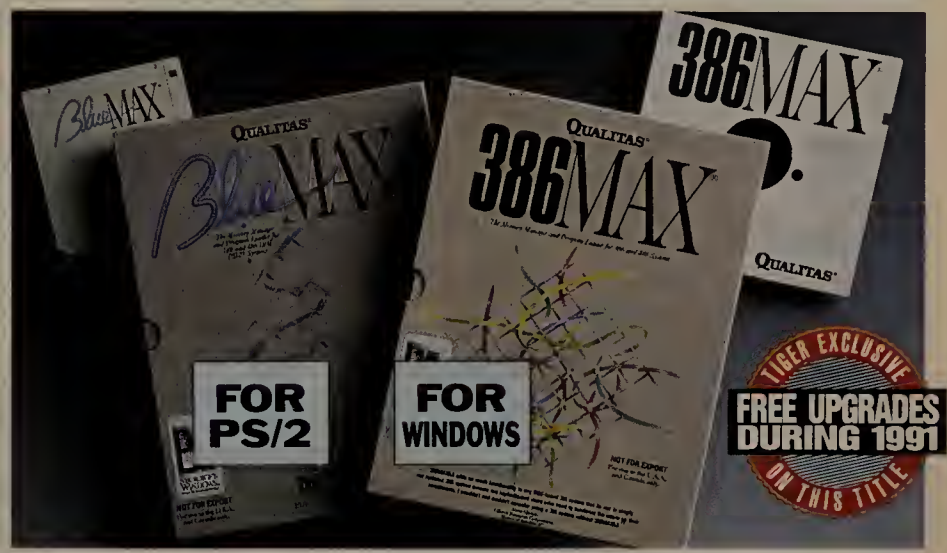
As Steve Gibson of Gibson Research Corporation (makers of SpinRite II) says: "I wouldn't and couldn't consider using a 386 system without 386MAX 5.0."

QUALITAS®

386MAX

RY 1950 **386MAX** 5¼" & 3½"	**$130.00**
RY 1960 **BlueMAX** PS/2, 3½"	**$155.00**

System Requirements: Any 386 or 486 based computer, minimum 256K extended memory, PC/MS DOS 3.0 or later. Supports LIM 4.0 EMS, XMS 3.0, VCPI and Virtual DMA Services 1.0.



Required Software for Every Family Computer.

From Designing a Floorplan to Flying an F-16 Fighter...

Tiger brings you three spectacular BundlePacks, all designed to help you enjoy your family computer to the fullest.

Family/Better Living Pack.

First, there's the Family/Better Living Pack, including FloorPlan, Portfolio Manager, World Atlas, Crossword Magic and Home Inventory.

With FloorPlan, you can quickly lay out your dream house in just a few minutes. Position furniture on your screen before you move it back and forth (save backaches in the process).

Portfolio Manager allows you to organize, manage and create reports on your investments with powerful financial tools. Turn your investments into "smart money" with Portfolio Manager.

The World Atlas brings the world to your screen, with hundreds of maps, facts, figures, statistics and other useful information about the world, its people and its characteristics.

Crossword Magic is the Crossword Puzzle fanatic's "must have" guide.

Home Inventory helps you create a complete list of your property contained within your home. It's fast, easy and can come in very handy if you need to make an insurance claim.

Game Pak I.

No computer should be without these classic PC entertainment packages. Includes: Chuck Yeager's Advanced Flight Trainer, the incredible Chessmaster 2000, the chilling Hunt For Red October, Life & Death and Airplane Factory.

Learn to fly the Yeager way with Chuck Yeager's Advanced Flight Trainer. Unique windscreen cursors teach you as you soar through flawless takeoffs, landings, aileron rolls, Cuban 8's — even hammerhead stalls!

Use Airplane Factory to design your own airplane that you can fly in Chuck Yeager's Advanced Flight Trainer.

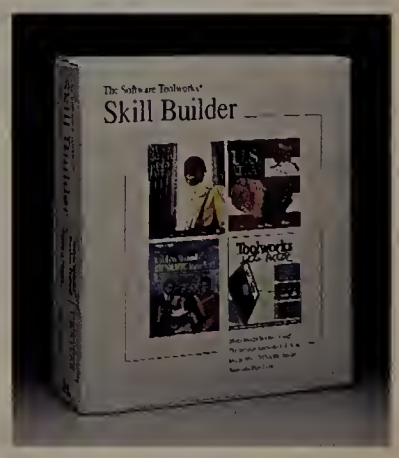
Challenge the world's most exciting computer chess game, Chessmaster 2000 — winner of the U.S. Open Computer Chess Championships two years in a row! Select a skill level or let the computer teach you the moves.

The Hunt For Red October, based on the best-selling novel, places you in complete control of one of the most powerful weapons on the planet. As commander of the nuclear powered submarine, Red October, you'll control the engines to be used for specific situations, the weapons to be fired and the route you'll take to freedom.

Or become a powerful surgeon at a bustling medical center in Life & Death. You'll talk with your patients, read charts, order x-rays and tests — and when the time comes, you will have to pick up the knife!

Skill Builder.

Family computing gets down to business with four very educational software packages. First, there's Evelyn Wood's Dynamic Reader, the premier reading enhancement system for any age level. Evelyn Wood is one of the world's foremost reading experts, and she'll teach you to read faster while retaining more of what you read.



There's also Mavis Beacon Teaches Typing! This is the industry's most popular typing system. So fast and easy, learning to type is actually fun!

DOS Tutor is a crash course on how your PC actually works, and how you can use it to its full potential.

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Circle 259 on reader service card

The Great Diskette Organizer!

Organize, Label and Catalog Your Diskette Library.

DISKETTE MANAGER 3 helps you print labels (both 5¼″ and 3½″) and generate library reports for everything on your diskettes. Just read your diskettes into the system; each diskette directory (including subdirectories) is instantly cataloged, you can then print labels and reports showing the contents of each diskette — or your entire library.

DISKETTE MANAGER 3 will accept all diskette types and sizes recognized by DOS including 5¼ or 3½ inch, fixed disks, tape backups, 360K, 720K, 1.2 Mb, 1.44 Mb, etc. Catalogs of your files can be created to contain up to 500 diskettes and 32,000 files.

Diskette labels are printed with a title, your comments, and a complete list of file names found on the diskette. You can use any one of the several pre-designed label formats that are provided with the program or design your own.

Printer Support.

All printers are fully supported. All printer codes, font types and sizes may be used for printing labels. Serial printers supported through DOS MODE command.

Catalog Capacity.

Each catalog may contain up to 500 diskettes and 32,000 files. An unlimited number of catalogs can be created. Catalog size limited only by disk space. The diskette title will hold up to 20 characters (upper and lower case). The date and sequential serial numbers may be automatically added. File names can occupy up to 66 lines on a 4″×1½″ label, and unlimited file names using additional labels. Comments can occupy up to eight 57-character lines. To find one particular file that's buried somewhere in that stack of fifty — or 500 — diskettes, quickly perform a catalog search to your specs.

Menu-Drive for Fast, Easy Operation.

Diskette Manager 3's menu-driven system makes it easy to create labels and reports to any specifications. Function-related help screens are available at a keystroke.

Built-in Formats for Labels!

Labels are printed with a title, your comments, and a complete list of the file names found on the diskette. You can use any of the several pre-designed label formats that are provided with the program.

BONUS!

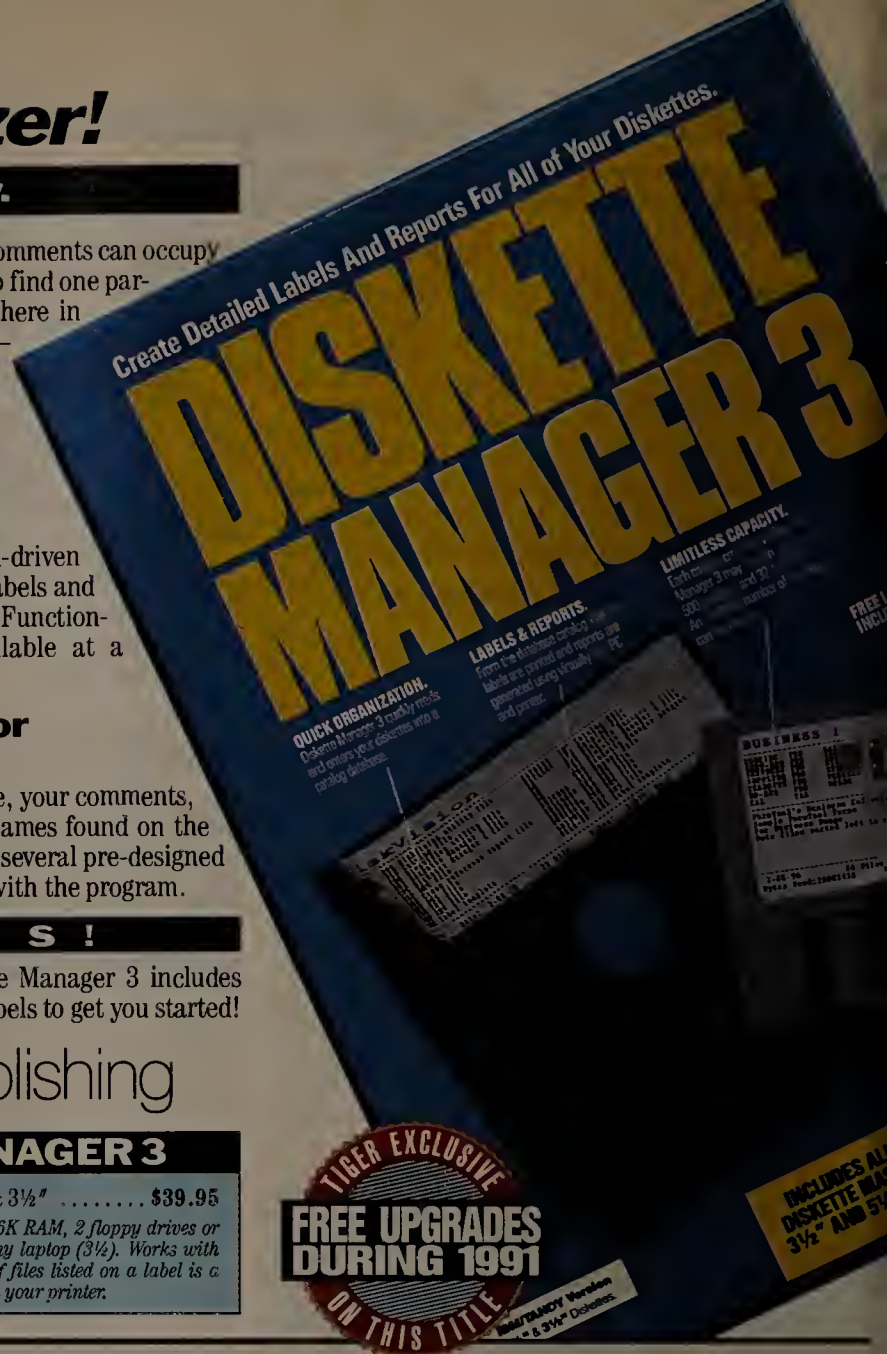
FREE LABELS! Diskette Manager 3 includes (20) 5¼″ and (20) 3½″ blank labels to get you started!

BLOCPublishing

DISKETTE MANAGER 3

RY 2220 **Diskette Manager 3** 5¼″ & 3½″ **$39.95**

IBM PC, XT, AT, PS/2 or compatibles, 256K RAM, 2 floppy drives or one floppy drive and a hard drive, or any laptop (3½). Works with any parallel or serial printer. Number of files listed on a label is a function of the character size available on your printer.



Quickly Convert Files Between Word Processor Formats!

Use All Existing Files with Different Word Processors.

Now those indispensible word processing files you created six months ago in another application can be easily converted to the format you're running now.

WORD FOR WORD is ideal for exchanging files of different formats with business associates, customers, friends — you can even convert files created on your home or laptop computer to the format used in your office — with all of the formatting commands (like bold, underline, centering, tabs, etc.) intact!

WORD FOR WORD is the fastest! It can convert a 25-page document in less than one minute — 600% faster than the competition!

Allows Lotus 1-2-3 Conversion INTO Your Word Processor!

WORD FOR WORD allows you to import spreadsheet data into your word processing format! And no other product allows you to perform conversion between "integrated" packages like Enable, Framework, Q&A and pfs: First Choice.

Supports Navy DIF, Peachtext and Enable and WANG PC.

Converts ALL Attributes!

...contained in the original: margins, tabs, indents, soft and hard carriage returns, boldface, italics, underlines, superscripts/subscripts, newspaper columns, headers, footers, centering, footnote formats, ruler lines, page ends — and more!

Protect Your Investment!

WORD FOR WORD is a powerful, yet flexible file conversion utility that enables you to protect prior investments in document files. It saves the time of re-inputting and extensive re-editing when the need arises to either convert or to communicate with another word processor software program.

Batch Processing Ability.

Converts up to 200 files in a single session. Supports DOS Wildcard conventions and full directory pathing.

Convert in Either Direction Between Any of These Formats:

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- EBCIDIC
- Enable 1.1, 2.0, 2.15
- Framework III 1.0, 1.1
- HP AdvanceWrite Plus
- IBM Writing Asst. Plus
- Lotus 1-2-3 1A, 2.0
- Lotus Manuscript 2.0, 2.1
- Microsoft Word 3.0, 3.1, 4.0, 5.0
- Microsoft RTF
- MultiMate 3.3
- Multimate Advantage I &II
- Navy DIF
- OfficeWriter 4.0, 5.0, 6.0, 6.1
- PeachText 5000
- pfs: First Choice 1.0, 2.0
- pfs: Write (version C)
- Professional Write 1.0, 2.0, 2.1
- Q&A Write 3.0
- Samna Word IV 1.0, 2.0
- Samna Word IV Plus 1.2, 2.0
- Volkswriter Deluxe 2.2
- Volkswriter 3, 1.0
- Volkswriter 4
- WANG PC 3.0
- WordPerfect 3.0, 4.1 4.2, 5.0
- WordStar 3.3, 3.45, 4.0, 5.0, 5.5
- XyWrite III, III Plus

Upgraded Support:

- Multimate 4.0,
- WordStar 6.0,
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**The new "stripped" ASCII is designed for the needs of typesetters and desktop publishers. It contains less formatting recognition than standard ASCII.*

New Formats Added:

- Excel – The ability to convert MicroSoft Excel spreadsheet data to and from word processors (similar to our Lotus 1-2-3 conversions).
- DCA/FFT – The ability to convert Displaywrite final form text both to and from.
- Total Word – From Volkswriter

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IBM PC, XT, AT and compatibles with 256K RAM.

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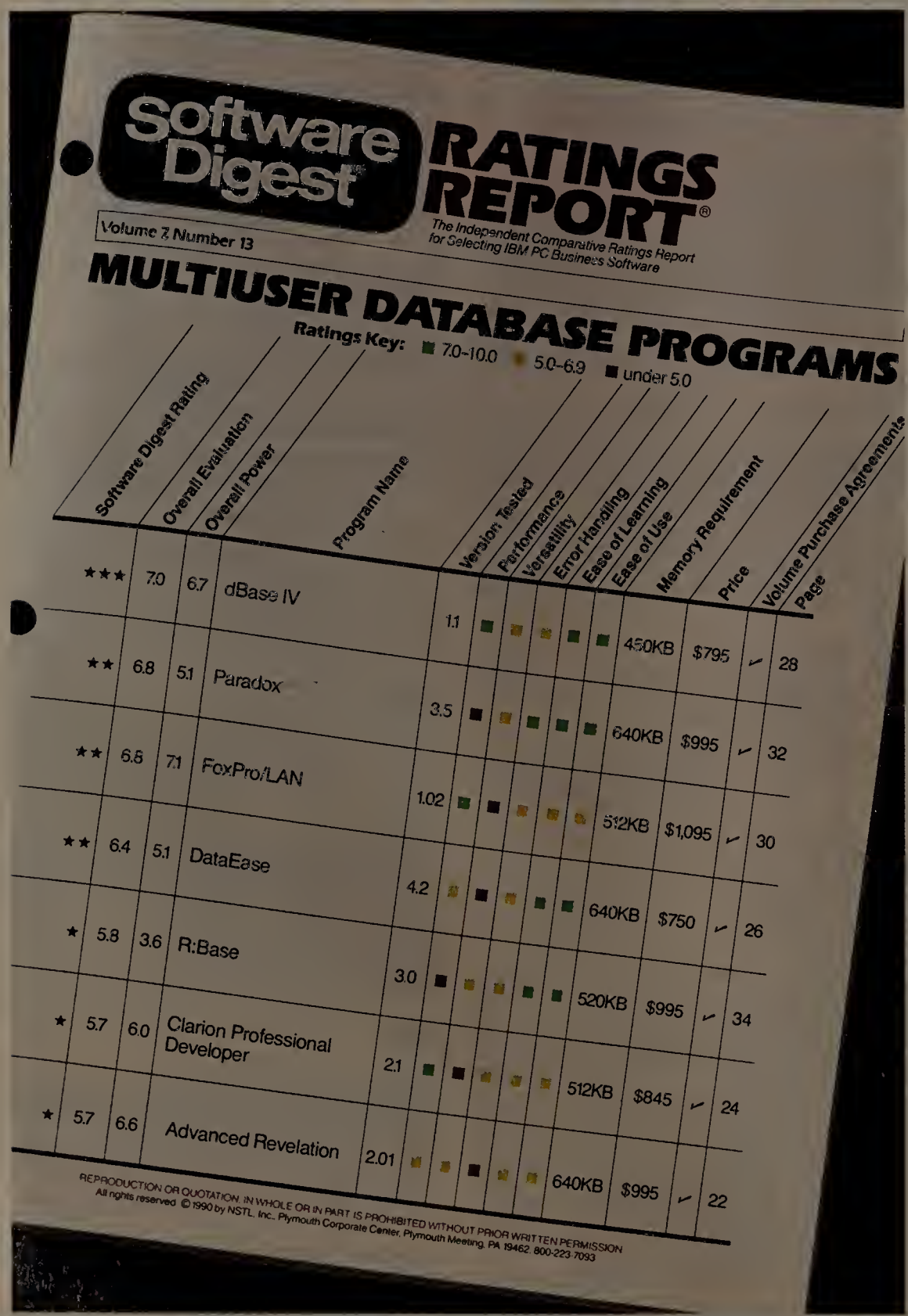

Software Digest RATINGS REPORT®

The Independent Comparative Ratings Report for Selecting IBM PC Business Software

Volume 7 Number 13

MULTIUSER DATABASE PROGRAMS

Ratings Key: ■ 7.0–10.0 ■ 5.0–6.9 ■ under 5.0

Software Digest Rating	Overall Evaluation	Overall Power	Program Name	Version Tested	Performance	Versatility	Error Handling	Ease of Learning	Ease of Use	Memory Requirement	Price	Volume Purchase Agreements	Page
★★★	7.0	6.7	dBase IV	1.1	■	■	■	■	■	450KB	$795	✓	28
★★	6.8	5.1	Paradox	3.5	■	■	■	■	■	640KB	$995	✓	32
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★	5.8	3.6	R:Base	3.0	■	■	■	■	■	520KB	$995	✓	34
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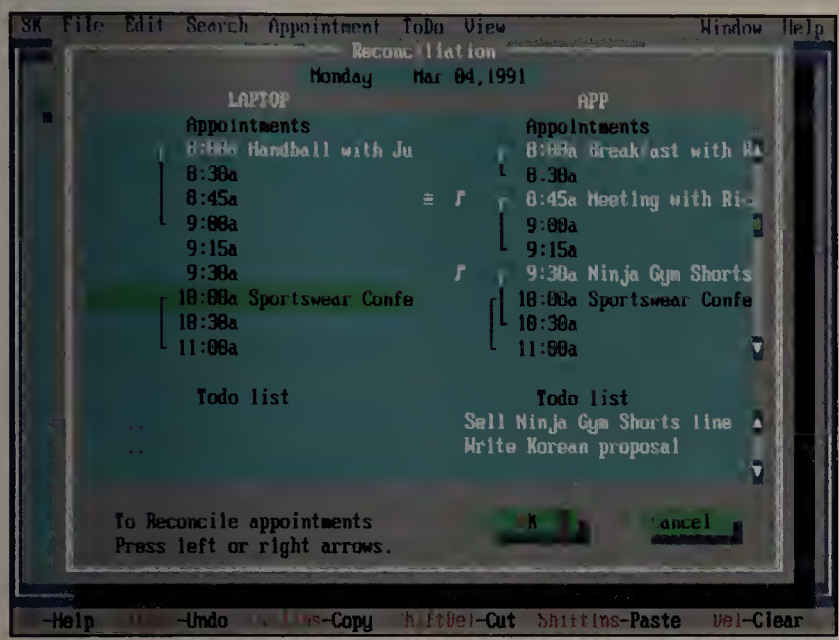
Sidekick Scheduling Wises Up

Sidekick 2.0 loses its file manager and outliner but gains a slick, mousable interface and clever scheduling help.



One problem with switching between a laptop and a desktop PC is that your schedule starts to slip out of sync. Sidekick 2.0 lets you compare two schedules and merge selected appointments.

Eric Brown

Scheduling packages like Borland's *Sidekick* are great for keeping your business life on track. But if you install a copy of the program at the office, one on your home PC, and one on your laptop, the various schedules will start to diverge, resulting in tedious updating or missed appointments.

Version 2.0 of *Sidekick* ingeniously solves this problem with a way to reconcile your schedules. Simply load two daily logs on screen and select the appointments you want to merge. You can even convert appointment files to palmtop organizer format, so you can download your log into a Sharp Wizard, for example, and merge the updated schedule back into *Sidekick* when you return.

Of course, *Sidekick* is more than just a time planner—version 2.0 also beefs up the notepad, address book, calculator, and communications modules and revamps the interface throughout. At the same time *Sidekick* loses its file manager and outliner. Clearly, Borland is moving *Sidekick* away from the all-in-one utility market, currently dominated by the more complete *PC Tools*, and toward the lucrative contact- and time-management genre. Borland will continue to sell *Sidekick Plus* for the utility market.

The Well-Modulated Mouse

The new mouse-based, pull-down–menu interface is similar to that of rival *PC Tools*, but more complete. You can interactively stretch or condense an appointment, and you can hold down arrow buttons to increase or decrease time or other values. A window manager lets you flip between the various modules and zoom and resize windows, but you can still work happily with keys alone. *Sidekick* is as unobtrusive as ever—and it can now stay in the background in only 40K of memory (compared with *Sidekick Plus*'s 75K).

The scheduler is the most improved module—over and above its talents at reconciliation, it adds prioritized to-do lists, a detailed weekly view, and alarms that can call phone numbers and activate remote pagers. For most businesspeople, paper-based organizers are still more common than palmtop computers and pagers. *Sidekick* lets you choose from a variety of slick calendar printouts that exploit multiple fonts and shading, and you can choose time-planner formats such as Day-Timer.

Closer to Paradox Am I

Improved network support based on Borland's *Paradox Engine* technology lets you compare and reconcile schedules across the net (only two at a time). You can hide appointments that you mark private. There's full record locking and multiuser screen refresh, so your screen is updated when changes are made across the LAN. All files are in *Paradox Engine* format, so *Paradox* users can work directly on *Sidekick* data.

Other *Sidekick* modules also sport changes, especially the Notepad, which has become a capable mini–word processor. New features include automatic reformatting, a margin and tab ruler, an undo feature, and even a speller and thesaurus.

Old *Sidekick* hands may flinch at the way the address book now makes each record look like a Rolodex card, but you get used to it, and the mouse control comes in handy. Most helpful is a row of alphabetical card tab buttons at the top of the screen—to jump to the Wilson record, for example, you simply click on the alphabetical button marked *W*. The addition of an auto-dialer let you turn *Sidekick* into a contact manager, and you can even send messages to pagers.

The simple modem communications features have been broken out into a separate module. The four calculators are much the same, but they now display financial variables on screen, and the mouse support makes them much easier to use.

With its better hooks to *Paradox*, LANs, laptops, pagers, and palmtops, *Sidekick* now fits more smoothly into the typical work environment of the nineties—but it still seems as personal as ever.

Eric Brown is a senior editor for PC World.

SNAPSHOT

Sidekick 2.0

The venerable desktop organizer receives a mouse-based interface, advanced schedule-reconciliation features, and improved network support.

KEY FEATURES

- **Compares and merges schedules**
- **Easier network schedule sharing**
- **Prints calendars in popular formats**
- **Notepad adds speller and thesaurus**

AVAILABILITY

January 1991

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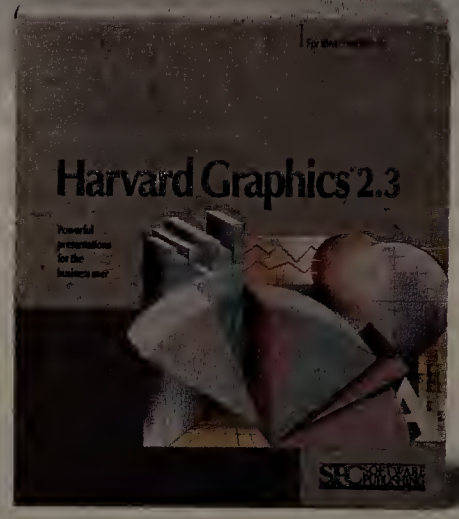

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PRODUCT OUTLOOK

Edited by MIKE HOGAN

AST Bravo 486/25

Muscle for the Masses: AST's Affordable 486

The AST Bravo's small footprint and low price may make it more enticing than its 486 rivals.

Powerful 486 systems may represent the cutting edge of technology, but they've taken a decidedly narrow slice out of the PC market thus far. Comparing benefits to price tags, users have concluded that 486s are best used as servers or CAD workstations.

AST's Bravo 486/25 could put a new spin on common wisdom and a compact-footprint 25-MHz 486 on your desk for a surprisingly low price. The least expensive model lists for $3995, and while that's without a monitor, the system isn't exactly stripped down.

This box comes with 2MB of RAM, a floppy drive, 800 by 600 super VGA, an IDE hard disk interface, a 101-key keyboard, one parallel port and two serial ports, and a PS/2-compatible mouse port. That's all on the system board, so you still have five 8/16-bit expansion slots open.

The Bravo line differs from AST's higher-priced Premium line in several key respects. The Bravo 486/25 lacks the upgradable CPU architecture of Premium systems, and fast RAM tops out at 16MB instead of 48MB. And if you plan on loading your 486 box, the Bravo's 145-watt power supply may be limiting.

Even with its 16-inch-square case, the Bravo has two externally accessible 5¼-inch half-height drive bays and two 3½-inch bays under the front plate. It won't hold the multiple gigabytes of storage of an AST Premium, but you can squeeze in a pair of 200MB IDE drives without having to add a controller.

An 18ms 80MB IDE hard drive adds $730 to the $3995 floppy-only price tag, while a 16ms 200MB drive is $1370. Displays range from a $225 14-inch monochrome VGA to a $745 14-inch color VGA that can run at 1024 by 768. Add the least expensive of these options, and you've got a 486 from a reputable vendor that lists for under $5000—not a bad deal. —*Rex Farrance*

IN BRIEF

AST Bravo 486/25
At the price of a 386, this small-footprint 25-MHz 486 workstation can tackle the toughest jobs around.
AST Research Inc.
16215 Alton Pkwy.
Irvine, CA 92713-9658
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INSIDE PRODUCT OUTLOOK

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104 **PalCom** Developers, make those *Paradox* apps run without *Paradox*.

106 **Seikosha LT-20** A 6-pound dot matrix printer means business on the road.

106 **GLC/SBS** It's a fax! No, it's an answering machine! No, it's a computer...

108 **StepCube** Elegantly designed servers help plan your LAN's future.

108 **Citrix Multiuser** This multiuser version of OS/2 lets you run cheap terminals off a 386 host.

110 **Outside In** With this data-snatching utility in RAM, there's no need to leave your word processor.

112 **EPL-7500, EPL-7000** Buy a LaserJet clone now and turn it into a PostScript printer later.

112 **NEC Pinwriters** Three bargains make a case for dot matrix printing.

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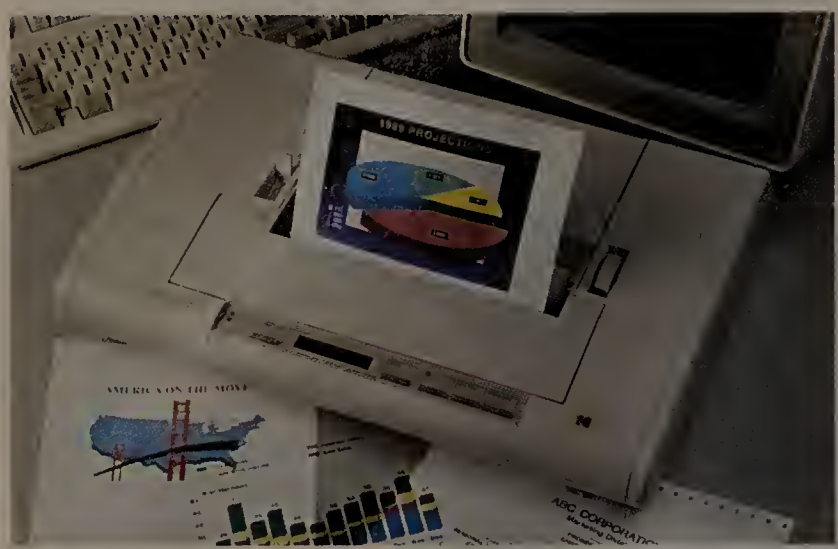
116 **Storyboard Live** Capture your audience with desktop presentations that make the most of animation, special effects, and sound.

Kodak Diconix Color 4 Printer

No-Smear, Plain-Paper Desktop Color



A new ink formula and an ink jet printhead let the Kodak Diconix Color 4 Printer provide colorfast printing at low operating costs.

Having captured the hearts and minds of more than a few travelers with its Diconix port-a-printers, Kodak is assaulting Hewlett-Packard PaintJet territory with a competitive color ink jet printer that retails for slightly more than the PaintJet but costs less to operate.

The Diconix Color 4 may win the loyalty of desktop presenters, thanks to output that dries faster and is less likely to smear than the PaintJet's. The Diconix uses the same ink jet printhead licensed from Hewlett-Packard for the Diconix 150 Plus portable printer. But rather than use one head for color and one for black, like HP's PaintJet, the Color 4 has four printheads, one each for cyan, magenta, yellow, and black. All contain Kodak ink that works on plain, 18-to-24-pound paper and handles the greasy-thumb smear test with aplomb. Still, it's not quite waterproof.

Another reason four heads may be better than two: You don't have to buy a new color cartridge every time you run out of one color. You'll also have less chance of smearing transparencies with the Color 4; switching to the printer's unique transparency mode uses 50 percent less ink and cuts drying time considerably. Kodak figures that ink conservation and printing on plain bond instead of a special ink jet paper cuts costs to about 9 cents per page—about half the PaintJet's per-page cost.

The Color 4's resolution of 192 by 192 dpi should result in images with smoother edges than the PaintJet's 180 dpi, but the Color 4 is no speed demon. It tops out at 125 cps (compared to 167 cps for the PaintJet), and that's in 96-dpi draft mode. Printing slows to 75 cps at 192-dpi resolution. But paper handling is downright slick, thanks to the Color 4's standard 60-sheet cassette feeder and ability to handle continuous-feed forms.

The Color 4 emulates the PaintJet, which means that such popular applications as *Harvard Graphics* will drive the printer. You get just three built-in fonts: Prestige 10 and 12 and Gothic 18 pitch. However, Kodak throws in a driver for *Windows 3.0* and its array of fonts, so you can download other fonts from, say, *Adobe Type Manager* into the Color 4's 64K of memory.

For $1495 (compared to the PaintJet's $1395 price tag), the Color 4 comes with four print cartridges, a parallel cable, a system ROM card, and *Windows* driver software. Black printheads are $13.95; color printheads are $19.95 apiece. —*Mark Henricks*

IN BRIEF

Kodak Diconix Color 4 Printer
Nonsmear ink, low consumables costs, and good graphics resolution make Kodak's ink jet a worthy competitor to the HP PaintJet.
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PalCom

Paradox Applications Without Paradox

Unlike *dBASE* applications, *Paradox* applications have always needed a certain something to work—namely, a copy of *Paradox* or its run-time version. That's no longer the case, thanks to the *PalCom* PAL compiler. Not only will *PalCom* turn your PAL scripts into free-standing EXE files, but it also will make them run faster and enable them to call C routines.

If you can do it in a *Paradox* script, you can probably do it in a *PalCom*-created program—and you can probably do it in less memory than with *Paradox* itself. A *PalCom* executable file excludes only a few commands that aren't relevant in a compiled environment anyway, such as the SETSWAP command that manages the swapping of PAL procedures in and out of RAM. *PalCom* also executes PAL's user-definable procedures.

PalCom has features that *Paradox* lacks, mouse support being the most visible. *PalCom*-created programs automatically sense the presence of a mouse and add scroll bars where needed. An application program interface for C programming takes you far beyond what the PAL language can offer. Other language extensions include the ability to view a table ordered by fields that weren't named as sort keys when the table was designed.

The compiler is one of the more significant additions in bringing your PAL toolbox up to par with those that dBASE programmers enjoy. But you'll still need a copy of *Paradox* to create tables, forms, reports, and other objects, and you'll have to debug your PAL programs (the first release of *PalCom* won't have a debugger). In addition to a copy of *Paradox*, *PalCom* requires 640K of RAM and DOS 3.1 or later; *PalCom*-created applications need only DOS 3.1 or later and 512K of memory. —*Celeste Robinson*

IN BRIEF

PalCom
Finally, a compiler to turn your Paradox applications into EXE programs that can be run without a copy of Paradox.
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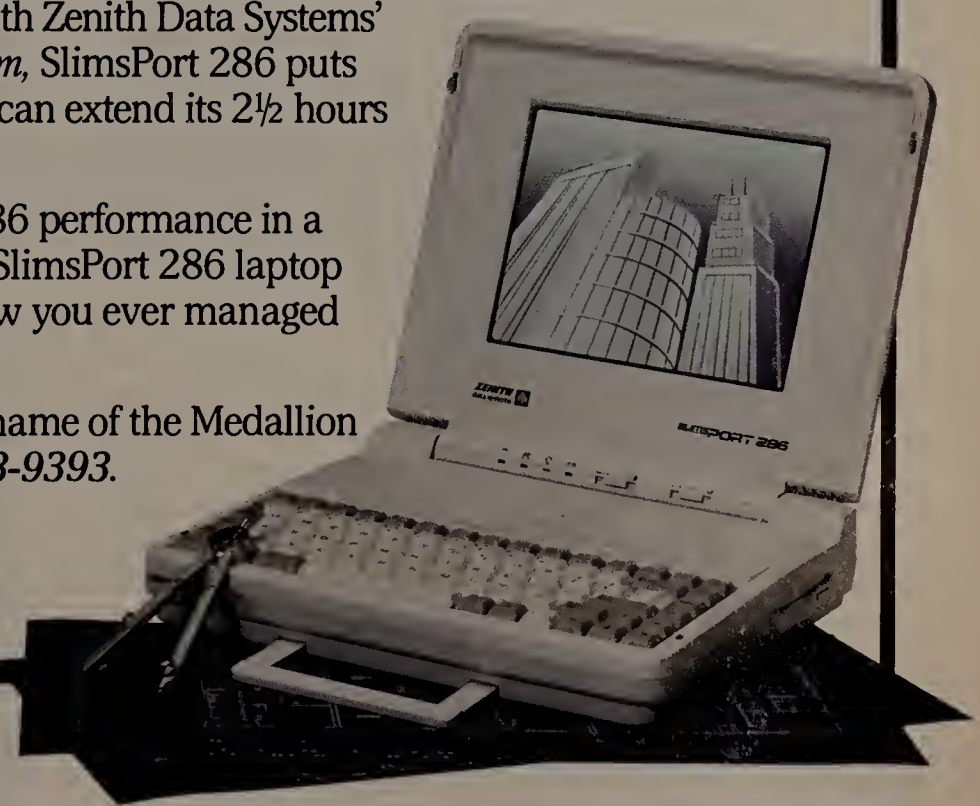

*Source: 1990 Dataquest estimate for U.S. battery-powered laptops. Graphics simulate Microsoft® *Windows™ version 3.0,* a product of Microsoft Corporation. *Intelligent Power Management* is a trademark of Zenith Data Systems Corporation.

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Circle 290 on reader service card

Seikosha LT-20

Print Any Paper, Anywhere, Anytime

Today's notebook PCs put the power of a 386 workstation inside your briefcase. But when it comes to taking printers on the road, your choice is usually lug 'em or leave 'em.

Like the Canon BJ-10e and Kodak Diconix 150 Plus, the Seikosha LT-20 is built—and priced—to move. At approximately 15 by 12 by 2 inches, the $499 unit is designed to slip easily beneath your laptop. The LT-20 weighs in at 5.9 pounds without batteries—a bit heftier than the Canon and Kodak units but still light enough for frequent flyers.

Unlike comparably priced rivals, the LT-20 is a 24-pin dot matrix printer, not an ink jet. That means it can print multipart forms—good news for traveling sales professionals who need to print invoices as soon as they close a deal.

The Seikosha is a little light in the font department, with one Courier face in 10, 12, and 15 characters per inch. However, Seikosha offers a user-installable ROM font card containing Roman, Helvetica, Gothic, and other typefaces in all three pitches. Out of the box, it offers 180-by-360-dpi graphics resolution and emulates the IBM Proprinter X24, simplifying software support.

An optional 1.75-pound nickel-cadmium battery pack should let the LT-20 print up to 100 pages between recharges—more than three times as many as the BJ-10e. An AC adapter is standard, and you can buy a 12- or 24-volt adapter that plugs into your car's cigarette lighter, in case you just *have* to print while talking on your car phone.

The LT-20 prints at a leisurely 60 characters per second in letter quality mode and a respectable 120 to 180 cps in draft, depending on the pitch. It comes with a 50-sheet A-size paper tray and a manual cut-sheet feeder, and it can handle envelopes, labels, and legal-sized paper. Prices for all options were unavailable at press time. —*Daniel Tynan*

IN BRIEF

Seikosha LT-20
At just under 6 pounds, the $499 LT-20 offers battery-powered, high-impact printing for users on the move.
Seikosha America Inc.
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Mahwah, NJ 07430
800/338-2609,
201/327-7227,
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Reader service no. 624

The 5.9-pound Seikosha LT-20 sits comfortably beneath your portable, sharing its footprint, for 24-pin dot matrix printing on the road.

GLC/SBS

The All-in-One Small-Biz Machine

If you're starting a small business or home office from scratch, a computer, a fax, and an answering machine are probably at the top of your shopping list—right after a telephone, of course. The GLC/SBS (Great Little Computer/Small Business System) from Cumulus fills all three needs in one box and throws in a 2400-bps modem.

This inexpensive small-footprint computer comes in 16-MHz and 20-MHz SX flavors. Cumulus tosses in such niceties as a mouse and a healthy software bundle: *DOS 4.01, Microsoft Works, Windows 3.0,* and a CompuServe sign-on kit. But GLC/SBS's forte is undoubtedly its communications hardware.

The modem, telephone answering system, and 9600-bps Group III send-receive fax all reside on the same board. Compact they may be, but these are full-function devices. Bundled fax software lets you log, view, print, enlarge, and convert files. The answering machine—which needs a hard disk—supports voice mail with three-digit user ID numbers and password security. The board supports two phone lines so you can hook up the fax to a data line and the answering system to a voice line.

The GLC/SBS is easy to upgrade. A special CPU card holds the SX chip, up to 4MB of memory, an IDE hard disk interface, and VGA on a daughterboard. To trade up, simply pull out the CPU card, remove the VGA daughterboard and memory, and return the stripped board to your dealer in exchange for a forthcoming 386DX or 486 version. The 386DX and 486 cards are due this quarter and will support 8MB of RAM.

The GLC/SBS's low-profile case has a total of five 8/16-bit slots, two of which are occupied by the CPU board and fax/modem card. In addition to two floppies, you can add either a 40MB or 100MB hard drive (both with a 25ms access time) or a 19ms 200MB drive. If you have disk-intensive applications, Cumulus offers a choice of a 16K or 64K hardware disk cache—actually another daughterboard that snaps onto the CPU card.

The 16-MHz GLC/SBS with a 3½-inch, 1.44MB floppy and a monochrome monitor lists for a mere $1395. Add $200 for the 20-MHz CPU and $300 for color VGA. A 25ms 3½-inch 40MB hard drive is another $400; the 25ms 100MB hard drive is $700; and the 19ms 200MB drive is $1100. The 16K disk cache module costs $200, the 64K version $250. —*Mark Henricks*

IN BRIEF

GLC/SBS
This aggressively priced PC for home and small business comes standard with fax, modem, and answering machine capabilities.
Cumulus Corp.
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Our state-of-the-art interactive demo disk makes it easy for you to evaluate NewWave. Call **(408) 376-2727** for your copy (handling charge $3.95). Then experience one of the most dramatic breakthroughs ever brought to your screen.

HEWLETT PACKARD

HP NewWave requires Windows 3.0 and an Intel 286 or 386 based PC with 640 Kb base and 2 Mb extended memory. Windows 3.0 is a product of Microsoft Corporation. © 1991 Hewlett-Packard Company NSS9016

StepCube

Everex's New Server Offers Quick, Unlimited Upgrades

Not too long ago, the main difference between an ordinary PC and a server was that one sat on your desk and the other stood on its end in the closet. Today, many manufacturers offer dedicated servers with special features, from a tower chassis to dual CPUs.

A new line of network servers from Everex emphasizes reliability, expansion capacity, and access to peripherals. The StepCubes are cube-shaped wonders with more room for devices than most towers and the potential to upgrade motherboards à la the Next machine. The top of the line is a 33-MHz EISA 486.

The futuristic StepCube shell hides externally accessible drives behind a motor-driven sliding door, and an LED display shows system status. Inside, the cube is divided in two: The system board, power supply, and expansion slots are on one side, the bays and drives on the other.

Snap-open side panels make it easy to get at boards and drives; twirl a few thumbscrews, and the drive cages slide out. The six-sided design means you can stack two, or even three, StepCubes, saving floor space without sacrificing ease of access.

Storage capacity is more than sufficient for most network needs. You get four front-access half-height bays and two internal full-height bays. Slot count varies with the model, but you'll get at least eight; and you can put up to 64MB of 32-bit memory on the 64-bit memory bus, which connects to a scalable (128K to 256K) external memory cache.

Each side of the computer has its own thermostatically controlled "smart" fan that kicks in extra chill whenever it's needed. To make sure that heat is minimal, the StepCube employs a powerful 400-watt power supply. Even when the cube is jammed with drives and multiple network boards, it's unlikely to draw more than 200 watts, so the power supply can coast, running way cool.

The StepCube server's innovative chassis provides maximum accessibility and plenty of room for expansion without a large footprint.

If you want a broad-bandwidth EISA bus to avoid network I/O bottleneck, you can choose from two 486/33 EISA models, with 8 and 12 expansion slots respectively. If you just need a fast workstation, you can select one of two ISA models—a 486/33 or a 386/33. The 8-slot 386/33 ISA model is $5899 without hard drive, while the 12-slot 486/33 EISA is $9999. Hard drives are $1199 for 160MB, $1999 for 330MB, and $2999 for 680MB—and they're all 16ms or better. —*Michael Goodwin*

IN BRIEF

StepCube
This innovative server gives you a motherload of upgradable power, with a space-saving chassis and easy access to components.
Everex
48431 Milmont Dr.
Fremont, CA 94538
415/498-1111
Reader service no. 623

Citrix Multiuser

Multiuser OS/2

A multiuser version of OS/2, *Citrix Multiuser* puts a PC twist on the mini and mainframe model of computing, letting you run dumb terminals off a 386- or 486-based host. Citrix claims broad software compatibility, higher reliability than in many existing DOS-based multiuser solutions, and a low per-user cost. The capacity is surprisingly high: A 25-MHz 486 host will supposedly support up to 64 users, who'll find their applications working at AT speed.

Citrix Multiuser employs character-mode OS/2 rather than Presentation Manager because that's typical of most accounting, data base, and other transaction-heavy applications written for OS/2. Except for the absence of Presentation Manager, *Citrix Multiuser* is a complete, Microsoft-licensed version of OS/2 1.21 and supports any character-based OS/2 package.

Since it also supports such networks as *LAN Manager* and NetWare, you can hang your host and its array of $350 terminals on a network as a single node—a much cheaper way of automating a department than buying the LAN hardware, PCs, and software to make everyone a node.

Citrix's $99 terminal-emulation program for PCs gives you the flexibility to, say, put everybody in accounting on terminals, while salespeople still have access to the host using DOS-based PCs.

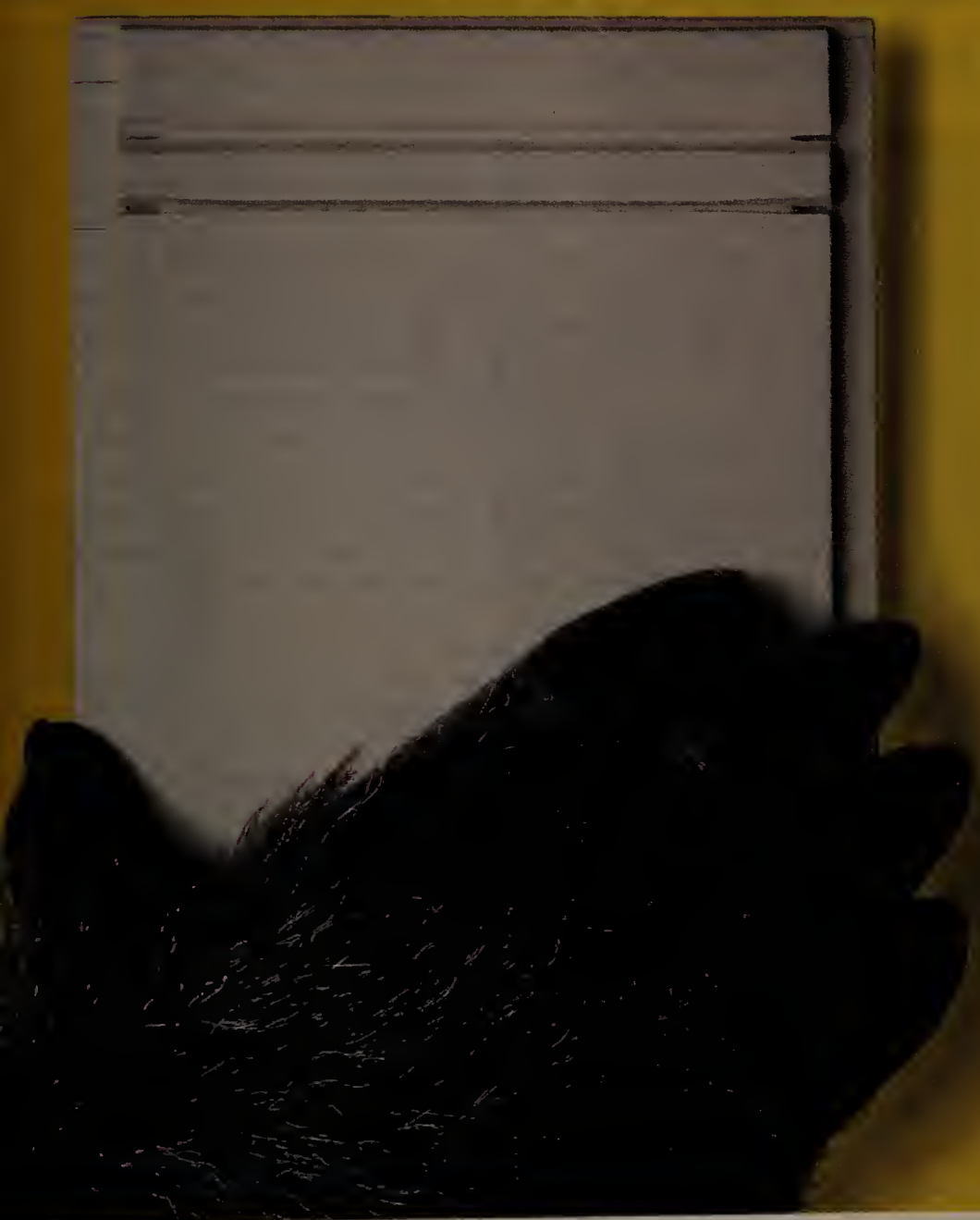
Citrix improved on OS/2 in other ways, notably by upgrading security so that you can restrict resource access by user. Since it runs in OS/2 protected mode only, one user's hijinks are unlikely to crash the whole system.

Citrix Multiuser requires a 386- or 486-based system and 4MB of memory, plus the terminals and connector hardware. It costs $995 for five users, and you can double the number of users for $495 more or add an unlimited number of users with a $1995 add-on. —*Mark Henricks*

IN BRIEF

Citrix Multiuser
A compatible extension to single-user OS/2 that saves you money by turning a 386 or 486 into a flexible multiuser host.
Citrix Systems Inc.
210 University Dr. #700
Coral Springs, FL 33071
800/437-7503,
305/341-6880 (fax)
Reader service no. 631

The Only Competition For Our New Gray Scale Scanner Requires A Much Bigger Hand.



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New ScanMan® Model 256 puts professional gray scale scanning within everyone's grasp. It captures all the details in your originals, in 256 shades of gray. And does what a big, expensive scanner can do, for a fraction of the price.

What sets ScanMan Model 256 apart is its ingenious Ansel™ software (Windows™ 3.0 compatible). Ansel lets you scan and print 8"x 11" images by effortlessly stitching two 4"x 11" images together. You can also instantly realign, resize, flip and rotate images.

PC Computing MVP MOST VALUABLE PRODUCT 1990

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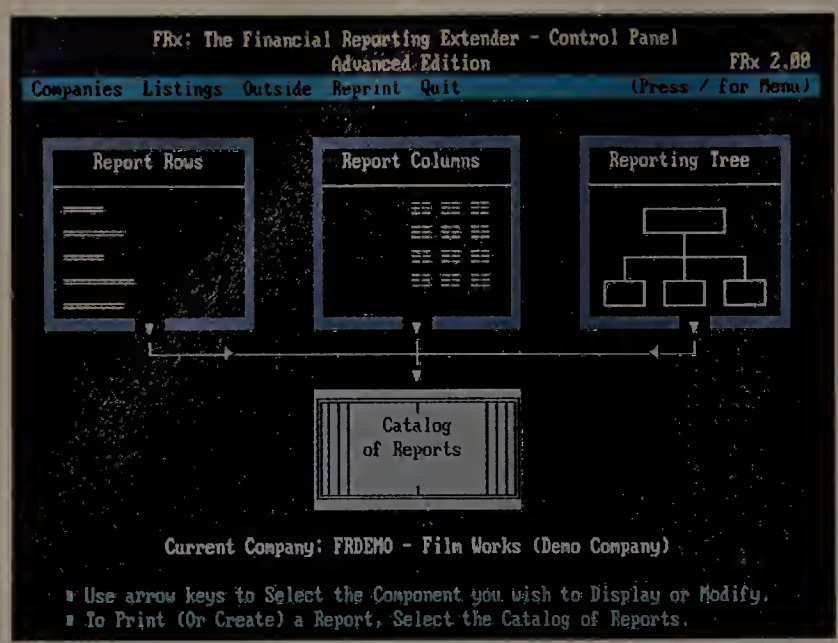
Circle 127 on reader service card.

FRx: The Financial Reporting Extender

Flexible Reporting Comes to IBM's Platinum Accounting



With greater design and output choices, FRx frees your report writing from the tyranny of the chart-of-accounts structure.

Ever try to create a custom financial report only to find that your accounting package limits your options? Low-end and high-end accounting packages alike often tie financial reporting inextricably to the general ledger's chart of accounts. *FRx*, IBM's new financial reporting module for the company's Platinum Series, saves you a lot of hassles by liberating your report writing from its chart-of-accounts structure.

FRx even provides a catalog of reports from which you can mix and match such components as row formats, column layouts, and "reporting trees" (representing the various reporting units within an organization). Your custom reports never alter the chart of accounts, and once created, each report can be saved and will appear as a menu choice.

The catalog of reports lets you customize final output, changing the level of detail shown in individual reports. For example, you can choose to show detail for each reporting unit in a final report or only summary information for an entire division or company.

You can preselect the amount and type of information you want included in the report; you can even have both posted and unposted amounts. *FRx* also generates exception reports, indicating missing information or duplicate account numbers. Reports can be printed to the screen, the printer, or an ASCII file.

FRx comes in two versions. The $495 Standard Edition is for small businesses that need only one or two levels of department summaries. The Advanced Edition ($1995) is geared toward larger businesses, offering ten levels of reporting detail.

Both versions read general ledger account balances and provisional balances from other Platinum Series modules. The Advanced Edition reads *1-2-3* and *Excel* files and lets you import the reports back into your spreadsheet.

FRx: The Financial Reporting Extender requires 512K of RAM (640K on a network), DOS 3.2 or later, the *Platinum System Manager*, and the *Platinum General Ledger*. —*Roberta Furger*

IN BRIEF

FRx: The Financial Reporting Extender
The 20th module of the Platinum Series simplifies the creation of complex financial reports and lets you use spreadsheet data.
IBM Desktop Software
472 Wheelers Farms Rd.
Milford, CT 06460
800/426-7699
Reader service no. 630

Outside In

TSR Reaches Out to Incompatible Files

Outside In is a RAM-resident utility that makes it a snap to import character-based data from spreadsheets, data bases, and other applications into word processing documents. No more exiting your application to start a viewing and importing utility. Forget about stripping hard returns from ASCII files. You can use *Outside In* for tasks as pedestrian as grabbing an address from a data base, or as complicated as assembling an annual report from files in different formats created by different users on a network.

Designed to pop up within a document, *Outside In* lets you browse files in many major applications, viewing the data in native format. Select what you need, whether it's a few lines of a spreadsheet or a cluster of data base records, and just touch the <Insert> key to pop them in correctly formatted.

If you can afford the 50K to 70K of memory overhead, *Outside In* can save you many keystrokes. It reads 37 word processor file formats, including *WordPerfect*, *Word*, *WordStar*, and three Macintosh formats. The 11 spreadsheet formats supported include *1-2-3*, *Excel*, and *SuperCalc 5*, and it can read native files from *dBASE*, *Clipper*, *Foxbase*, and seven other data bases.

IN BRIEF

Outside In
This RAM-resident utility lets you easily transfer data from a wide variety of applications into your word processor.
Systems Compatibility Corp.
401 N. Wabash #600
Chicago, IL 60611
800/333-1395,
312/670-0820 (fax)
Reader service no. 625

Outside In isn't perfect. You can't view *Paradox* files in native format, and unless you preset columns in your word processor, you'll have to do some tab adjustments after bringing in spreadsheet and data base tables. And its memory requirements are significant if you're loaded with network drivers and TSRs.

Nonetheless, it's hard to find a DOS utility that lets you import more files with less work from a greater variety of applications—and retain underline, boldface, italics, and so on. *Outside In* costs $99; a LAN server version for $299 includes licenses for five nodes; each additional node is $49. —*Mark Henricks*

Award Winning Accounting Software Your Best Buy only $49.95

The reviews are in and Pacioli 2000™ accounting software has surpassed all expectations. Now, it has been honored by PC World as the "Best Buy". Whether you have already computerized your accounting or you are ready to purchase accounting software, please read on.

Pacioli 2000 is the hottest new accounting package on the market. Designed by J. M. Hurtado, who started the accounting software revolution in 1985 with DacEasy© Accounting, Pacioli 2000 is the FIRST full-featured, network-ready accounting software for only $49.95. It gives you everything you need while saving you hundreds, even thousands of dollars over other software. But you don't have to take our word for it. Listen to the experts.

"... the equal of other high end accounting programs in every way but cost."
New York Times, July 1, 1990

With all its power, pull-down menus, full mouse support and context-sensitive help, Pacioli 2000 is as easy to use as a checkwriter. You get examples, guides and suggestions, an automatic installation routine, and a file inquiry system that lets you make inquiries or create accounts "on the fly".

Pacioli 2000 integrates all 8 modules into one powerful system: General Ledger, Accounts Receivable, Accounts Payable, Inventory Control (including true FIFO and LIFO), Billing, Purchasing, Budgeting and Auditing. Learn one and you've learned them all.

"... a full-featured package that adds the extra element of network support."
Computer Reseller News, April 23, 1990

Pacioli 2000 is fully networkable, which means one user or any number of users can enjoy the same easy-to-use, powerful features with no additional fees. It is ready to perform as multi-user accounting software that includes multi-level password protection, file and record locking, transparent user management and more.

"... the best software value of the year."
PC Week, August 27, 1990

Also included is FREE customer support for 30 days. If you have any questions while using Pacioli 2000, the answers are as close as your telephone. Our Customer Support Staff is always ready to help you.

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M•USA Business Systems, Inc.
18111 Preston Rd., Suite 500
Dallas, Texas 75252

Minimum Hardware Requirements: IBM or compatible computer with 640Kb, hard disk, monochrome or color monitor, mouse optional, MS-DOS 2.1 or later for single users (3.1 or later for networks), 132 column dot matrix printer in compressed mode.

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Circle 7 on reader service card

EPL-7500, EPL-7000

Leaving Your Printing Options Open

Should you get one of the new low-cost personal lasers with LaserJet Series II emulation, or should you go the whole hog and get one equipped with true Adobe PostScript? Epson doesn't make you choose, at least not right away.

Epson has just introduced two near-identical 6-ppm lasers, the EPL-7500 and the EPL-7000. The difference? The high-end EPL-7500 has a RISC-based PostScript controller for fast graphics printing plus a megabyte and a half more memory than the EPL-7000. Both printers promise to be among the best and brightest of their classes.

Priced at $1399 (probably under $900 on the street), the EPL-7000 is a personal laser that is half again as fast as the 4-ppm Hewlett-Packard LaserJet IIP. It has what Epson calls dual-channel capability—so, for example, you can configure its serial port for LaserJet emulation and its parallel port for Epson FX emulation and have it automatically switch between print jobs queued in its buffer. An optional ROM card slips in a front slot and gives you HPGL emulation; memory tops out at 6MB.

While the EPL-7500 ties with the $3299 Apple Personal LaserWriter NT as the priciest personal PostScript laser, its 16-MHz Weitek RISC controller gives it a decided edge over the Apple. You get not only PostScript Level I with its 35 standard fonts but also the latest version of Hewlett-Packard's PCL 4. Memory tops out at the same 6MB as in the EPL-7000, and the EPL-7500 lets you pull the same dual-channel trick, except that you have to switch between emulations using the front LCD panel.

Both printers offer excellent paper-handling flexibility. You get a 250-sheet input tray with a single-envelope feed and an option for a second 250-sheet tray. You also get better print quality than with these printers' predecessor, Epson's EPL-6000, which now is headed for mass merchants under the label Action Laser. The EPL-7500 has a pretty standard 3000-page-per-month duty cycle, and its convenient single cartridge drum/toner assembly yields a better-than-average cost per page of 2.3 cents.

The nice thing about this duo is that you can buy the EPL-7000 today and turn it into the PostScript-equipped EPL-7500 with 2MB of memory just by swapping controllers and paying $2220. That's a small premium over what you would pay if you had bought the EPL-7500 in the first place, but not all of us are ready to get into PostScript right away. Why spend money today if you can put it off until tomorrow? —*Mike Hogan*

You can buy the LaserJet-compatible EPL-7000 today and upgrade to the PostScript-compatible EPL-7500 (shown) just by swapping the controller.

IN BRIEF

EPL-7500, EPL-7000
A dynamic print duo gives you fast, low-cost HP PCL 4 emulation today and PostScript tomorrow with a simple upgrade.
Epson America
20770 Madrona Ave.
Torrance, CA
90509-2842
800/289-3776
Reader service no. 627

Pinwriter P3200, P3300, and P9300

Nonimpact Print Alternatives Go Home

Laser and ink jet printers are getting most of the press and a lot of the Fortune 500 business these days, but there's still a lot of kick left in dot matrix technology. What else can you use for wide-carriage printing or multipart forms? The 24-pin story is, basically, a lot more features for a lot less money than ever before.

The entry point is NEC's $429 Pinwriter 3200. For about a third the price of most low-end lasers and with far lower operating costs, you can get letter quality output at about a page per minute. Both the P3200 and its wide-carriage sibling, the $599 P3300, cost you approximately half a cent per page, around a fifth of a laser's printing bill.

The P3200 and P3300 have a modest but adequate feature set: A tractor feed and 8K buffer are standard on both models. Among the seven resident fonts is a special Quick Gothic typeface NEC designed for fast letter quality printing, enabling you to turn out correspondence at 108 cps—about a third again as fast as most comparable dot matrix printers.

For network printing, the high-speed NEC 9300 is worth a look. This wide-carriage model has solid paper handling with an integrated push tractor, paper parking, and automatic paper loading. A pull tractor and sheet-feed bins are optional.

This $1395 24-pin pounds out six-part forms at 400-cps draft and 200-cps (about 4 pages per minute) letter quality in eight resident type styles—including a nifty 200-cps version of Quick Gothic. An 80K buffer lets you store 40 pages. Swap in a three-color ribbon and switch modes, and you can use the 9300 as a low-end color solution. At 360 dpi, graphics resolution equals that of the 3200 and 3300.

The P9300 offers a pull-tractor option for $169; also available are a one-bin 180-sheet feeder for $269 and a two-bin 360-sheet feeder for $339. —*Mark Henricks*

IN BRIEF

Pinwriter P3200, P3300, and P9300
The latest Pinwriters prove that dot matrix technology keeps chugging along, offering faster, sharper printing for less than ever before.
NEC Technologies, Inc.
1414 Massachusetts Ave.
Boxborough, MA 01719
800/632-4636
Reader service no. 628

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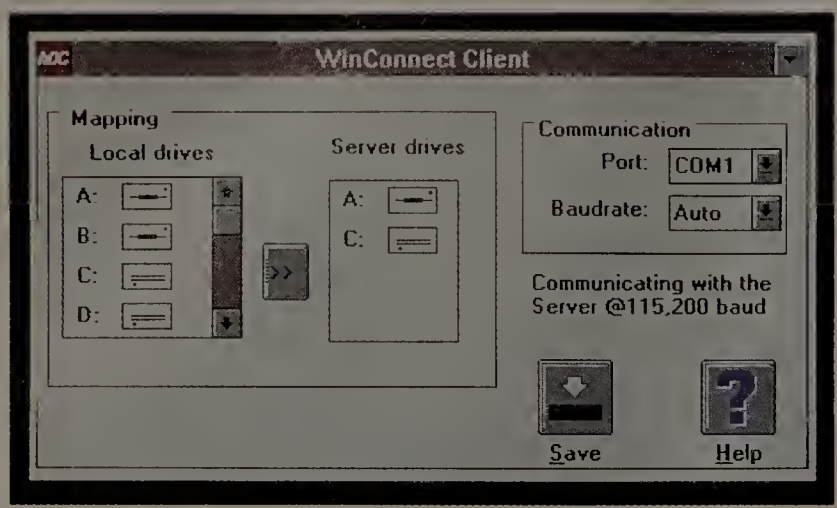
WinConnect, FileApps

Connecting Laptops to Windows



WinConnect (shown) and FileApps are two variations on a theme—transferring laptop files to your Windows-based desktop via cable.

With more people than ever toting laptops and using *Windows* on their desktops, the desktop-to-laptop file handoff is more complicated than ever. Part of the problem is that most laptops don't have enough memory or storage to regularly house *Windows* applications, so you're living in two environments.

Traveling Software and hDC have teamed up to create two new products, *WinConnect* and *FileApps*, which smooth file-transfer problems while enhancing *Windows'* file and disk management.

For $130, *WinConnect* does for *Windows* users what Traveling's *Lap-Link* has done in character-based environs—namely, beam whole subdirectories between laptop and desktop in no time. (A $99 introductory offer will be in effect for 99 days after the projected mid-February ship date.) In addition to the software, you get a $40 25-foot serial cable with which you can transfer data at 3MB per minute. A parallel cable costs $40 extra but transfers data at 5MB to 6MB per minute.

Because most laptops can't run *Windows* comfortably, *WinConnect* opts for a master/slave arrangement in which control rests with your *Windows*-based desktop. This means you can treat your laptop's hard disk as an extra drive. Thus, you can use *Windows'* own File Manager to transfer files—or use hDC's pop-up *File Enhancer*, which offers a more convenient interface than File Manager itself.

If you're more interested in *Windows* file management than in file transfer, you could use the same $130 to buy hDC's *FileApps*, a quintet of *Windows* accessories, one of which is *WinConnect* without the cabling. You also get a file undelete function and a graphic view of files and subdirectories. Other useful capabilities include windowed access to DOS, advanced search features, and file encryption.

The *FileApps* engine requires 17K, and each application takes 6K to 15K of conventional memory. A coupon in the *FileApps* package describes how you can buy high-speed 7-wire serial or 15-wire parallel cabling from Traveling Software. —*Susan Lusty*

IN BRIEF

WinConnect
Ease file transfers from character-based laptops to Windows 3.0 desktops by turning your laptop into an extra drive.
Traveling Software, Inc.
18702 N. Creek Pkwy.
Bothell, WA 98011
800/662-2652
Reader service no. 633

FileApps
This graphical enhancement to Windows 3.0's file manager makes managing your desktop easier and includes WinConnect software.
hDC Computer Corp.
6742 185th Ave. NE
Redmond, WA 98052
206/885-5550,
206/881-9770 (fax)
Reader service no. 634

Mathematica for Windows 3.0

Mo' Better Math

Looking for a way to do high-level math with your *Windows*-based graphic applications? Cast your eyes on *Mathematica for Windows 3.0*.

Designed to help scientists, engineers, and others in technical fields manage complex math problems, *Mathematica for Windows 3.0* handles a full range of computations from simple math through algebra and calculus, on into truly high-level problem solving, using such brainteasers as the LeGendre Polynomials for plotting the hydrogen atom wave equation.

In addition to the traditional graphs of ranges, you can even create 3-D objects such as cubes and spheres that graphically represent more complex equations.

What you see is what you use with this $995 program: Start typing an equation and, when you want an answer, just strike a hot-key combination. Your work is saved in "notebooks," which you can display in any number up to the practical limits of your screen size.

A built-in programming language lets you devise complex computations and create notebooks. These are compound documents that can include text from the built-in editor, computations, and the graphs that result from those computations. Change your computation, and its graph changes.

Not only can you solve problems, but you can explain, display, and manipulate them all on the same page. Notebooks can be distributed as reports to other users, who may add comments, questions, and ideas of their own. They can also plug in new variables and import information from their own spreadsheets to update the results and graphs.

Dozens of notebooks with statistical or other business, engineering, and scientific functions have been created and are available from Wolfram Research or third parties as add-ons. For this mathematical wizardry you need a 386 or 486 system, DOS 3.0 or a later version, 4MB of RAM, and 5MB of free hard disk space. —*Cathy Smith*

IN BRIEF

Mathematica for Windows 3.0
An interactive Windows program lets you cut weighty math problems down to size.
Wolfram Research, Inc.
100 Trade Center Dr.
Champaign, IL 61820
217/398-0700,
217/398-0747 (fax)
Reader service no. 635

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Storyboard Live

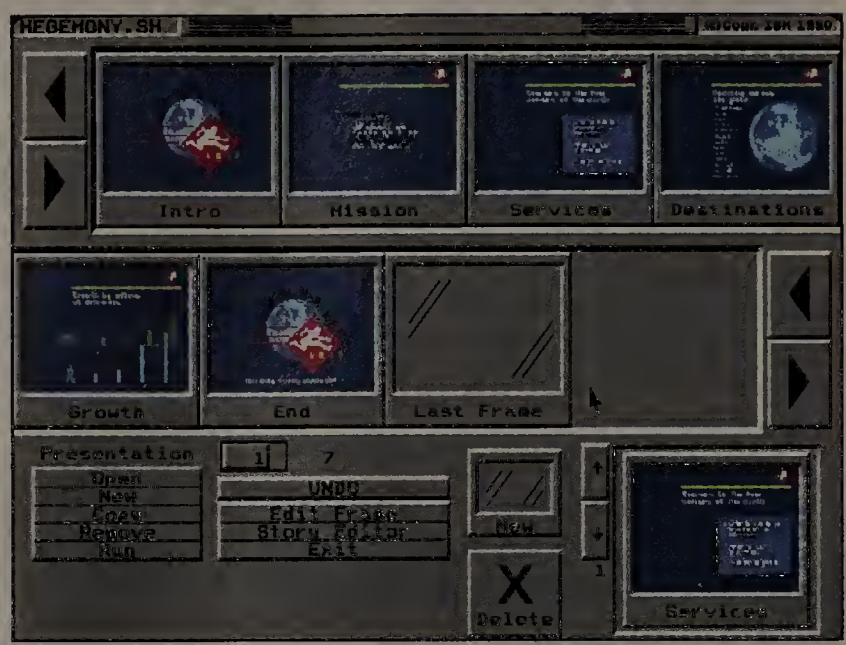
Full Screen Ahead for More Spritely Desktop Performances

One of the first packages for building on-screen business presentations, IBM's *Storyboard* now comes with a more complete assortment of bells and whistles for creating well-rounded multimedia presentations, product demonstrations, and interactive training materials.

Storyboard Live brings you this presentation bounty via its new Electronic Presentation module, which makes it much easier to organize presentations by letting you view and manipulate a sequence of up to eight "frames" (the equivalent of slides in a slide show). You also can employ one of the background templates throughout your presentation to give it a more consistent look. IBM tries to make *Storyboard Live* friendlier still by including both pulldown and pop-up menus. Ironically, these don't adhere to IBM's CUA conventions and may confuse you at first.

From the Electronic Presentation module, you switch to a full-fledged Picture Maker (to create, import, or modify frames) or to the Story Editor (for adding a wide range of special effects and actions to the presentation). *Storyboard Live* now includes an editor for creating and modifying animation routines ("sprites"). The package comes with 34 ready-made sprites, such as a baseball player swinging a bat. You also can tap eight built-in motion effects or create your own effects and connect them to objects to build your own sprites.

If you want to move further into multimedia, and have the full-motion video boards or video capture boards, the integrated video editor lets you show and edit full-motion or other video sequences on your PC. Even if you're outfitted with a vanilla PC, *Storyboard* lets you play back short video clips in a small on-screen window (although typically at a rate far below full-motion video's 30 frames per second). The audio editor enables you to exploit the rich capabilities of sound boards, such as those for MIDI music, and lets you play back music and other sounds on standard PCs—but the quality is marginal and the volume low.



Storyboard Live's Electronic Presentation module makes it easier to create and arrange sophisticated on-screen presentations.

Storyboard Live now supports TIFF, PCX, GIF, IBM Linkway, and IBM Audio Visual Connection files, plus super-VGA adapters and a broader range of audio and video graphics cards.

In keeping with its added functionality, *Storyboard* has migrated upward in price to $495, in required disk space to 4.5MB, and in required memory to 530K for VGA color, and it can't use expanded or extended memory. Upgrades from earlier versions of this multitalented storyteller are $120. —*Eric Bender*

IN BRIEF

Storyboard Live
The veteran on-screen presentation package adds handy organizational features, expanded animation capabilities, and an integrated video editor.
IBM Desktop Software
P.O. Box 2150
Atlanta, GA 30035
800/426-7699
Reader service no. 642

Valitek PST-60, PST-160, PST-250

One Tape Backup for All Your PCs

You no longer have to buy a tape backup unit for each and every member of your work group or consign them to floppy disk backup programs. Valitek offers several sizes of tape drive, each of which can handle an officeful of PCs.

There's no need to install a controller in each system you're backing up, since the portable Valitek PST-60, PST-160, and PST-250 plug into the systems' parallel or serial ports. As their names suggest, these shoe box–sized backup units come in 60MB, 160MB, and 250MB models.

Using an IBM-standard parallel port, backup speed ranges from a respectable 1MB a minute on an 8086 to 4.2MB a minute on a fast 386. RS-232 serial transfers can be expected to be much slower, about the speed that a system writes to a floppy.

The 60MB and 160MB models use TEAC QIC-02 drive mechanisms and shirt pocket–sized tape cassettes. The PST-250, on the other hand, uses ¼-inch cartridges; none of the media requires formatting before use. You can launch a program from your backup or restore to either a floppy or a hard disk.

Backup and restoration features include on-screen selection of files or directories, tagging by wild card, and selection by file attribute. You can append multiple backup sessions to the same tape or put a large backup on multiple tapes. The Valitek PST-60 lists for $1695, the PST-160 for $1995, and the PST-250 for $2495. —*Rex Farrance*

IN BRIEF

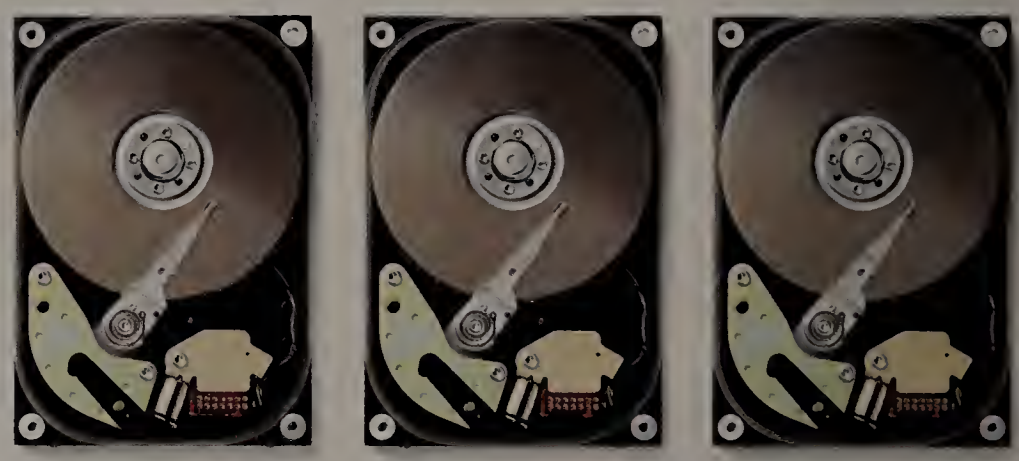
Valitek PST-60, PST-160, PST-250
These tape drives back up multiple PCs quickly using a standard parallel or serial port, with no controller required.
Valitek, Inc.
Mountain Farms
Hadley, MA 01035
800/825-4835,
413/586-6718 (fax)
Reader service no. 632

Circle 256 on reader service card

IT HAS BEEN
BROUGHT TO
OUR ATTENTION
THAT NOT EVERYONE
BELIEVES
PORTABLE PCS
CAN BE AS
FUNCTIONAL AS
DESKTOP PCS.

THIS SHOULD

This may be hard to believe, but there really is such a thing as a portable PC that can do everything a conventional desktop can.

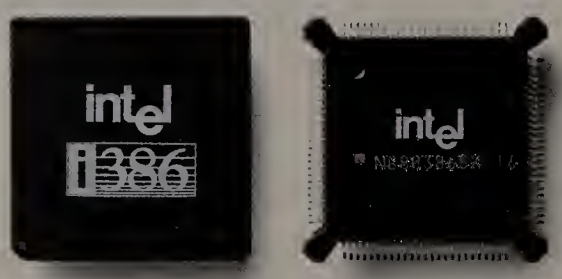


Some people can't imagine squeezing a 40, 100 or even a 200MB hard disk into a portable PC. But when they take advantage of all that storage capacity, they find it hard to imagine life without it.

In fact, there's not just one, but an entire line of them. They're called Toshiba Portable Desktops,™ and they'll forever change the way your company looks at power and productivity.

To get more information or a free Portable Desktop productivity survey, call 1-800-477-1616.

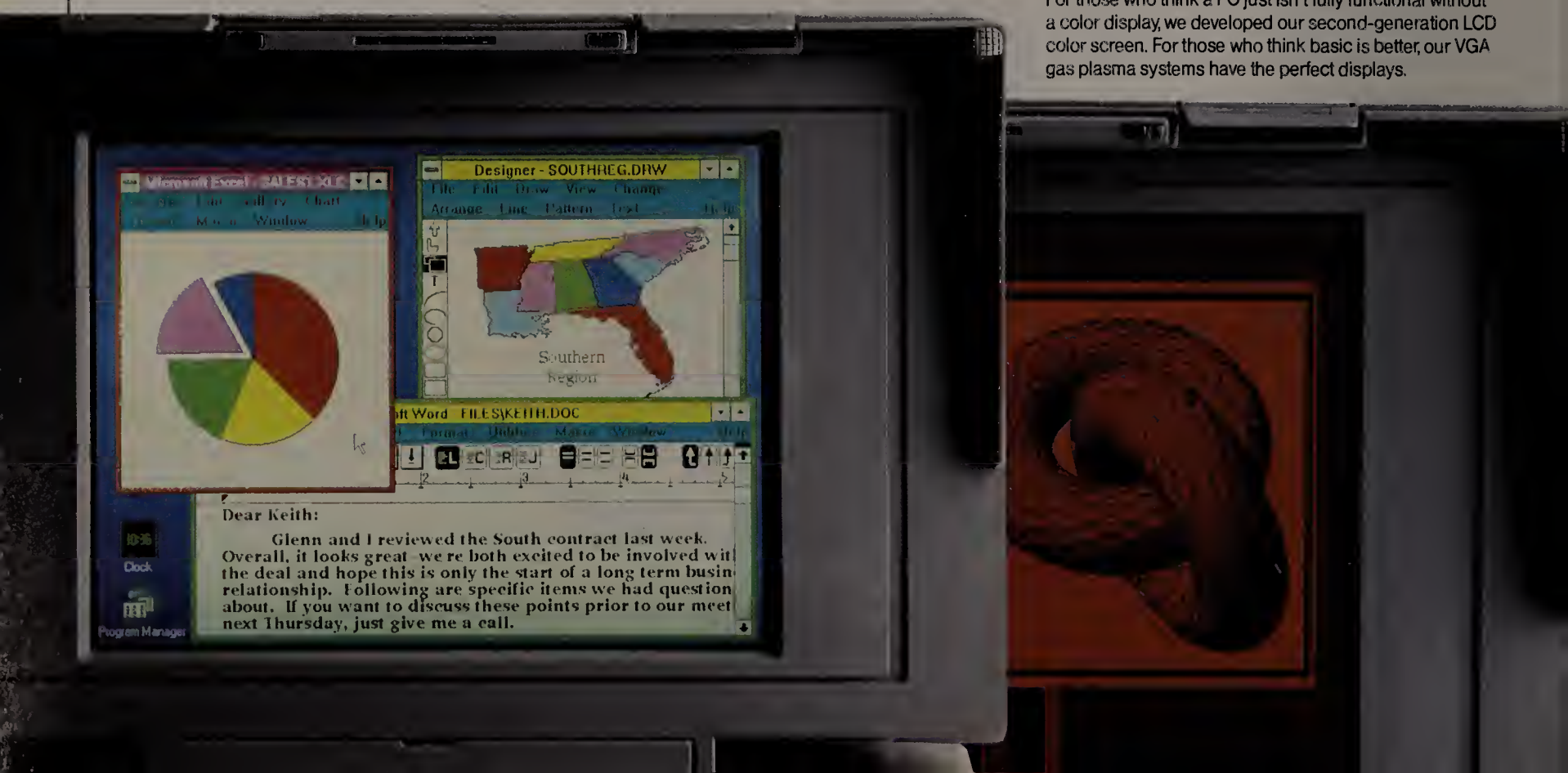
True, some business people may have trouble grasping the notion of desktop power in a portable, but when you give it some thought, it's the next logical step in computers.



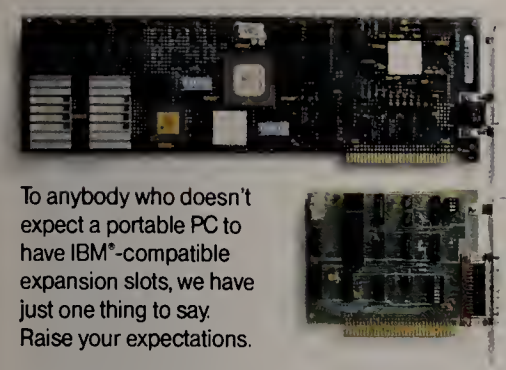
There once was a day when microprocessors this powerful were unheard of in a portable. Luckily for people who crave raw power and computing speed, that day is over.

With 386™ and 386™SX microprocessors, our Portable Desk-

For those who think a PC just isn't fully functional without a color display, we developed our second-generation LCD color screen. For those who think basic is better, our VGA gas plasma systems have the perfect displays.



REMOVE ALL DOUBT.



To anybody who doesn't expect a portable PC to have IBM®-compatible expansion slots, we have just one thing to say. Raise your expectations.

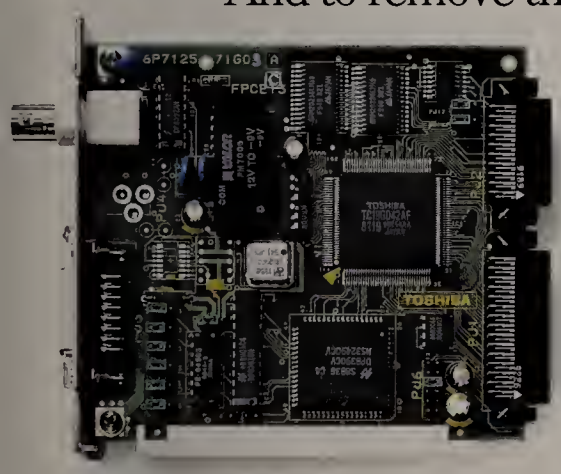
tops run all of the same applications as your company's conventional PCs. With hard disk drives from 40 to 200MB, you have all the flexibility to configure a system the way you want it.

Anyone who insists portable PC users are doomed to cramped, undersized keyboards hasn't gotten their hands on a Toshiba. We use standard-size keys and standardized key spacing so your hands will feel right at home.

With the connectivity of our multiple expansion slots and ports, our Portable Desktops fit right in with your existing system and grow as your company grows.

They say you can't squeeze much memory into a portable PC. But considering that our dedicated memory expansion slots let you add up to 12MB of RAM as your need for power grows, it looks like "they" were wrong again.

And to remove the last possible barrier between your needs and our portables, we've even designed one with a high-resolution VGA color screen.



With an expansion slot for a LAN card, you get complete networking freedom without giving up all your other expansion slots.

In other words, it really is possible to have all the capabilities of a conventional desktop in a portable.

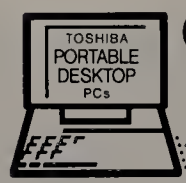
All you have to do is try one. And believe.

T5200. 386 microprocessor, 40, 100 or 200MB HDD, 2 to 14MB RAM, 2 IBM-compatible expansion slots (in addition to dedicated memory slots), VGA plasma display.

T5200C. 386 microprocessor, 200MB HDD, 2 to 14MB RAM, 2 IBM-compatible expansion slots (in addition to dedicated memory slots), VGA passive matrix color LCD display.

T3200SX. 386SX microprocessor, 40 or 120MB HDD, 1 to 13MB RAM, 2 IBM-compatible expansion slots (in addition to dedicated modem and memory slots), VGA plasma display.

NOW THAT YOU'RE CONVINCED



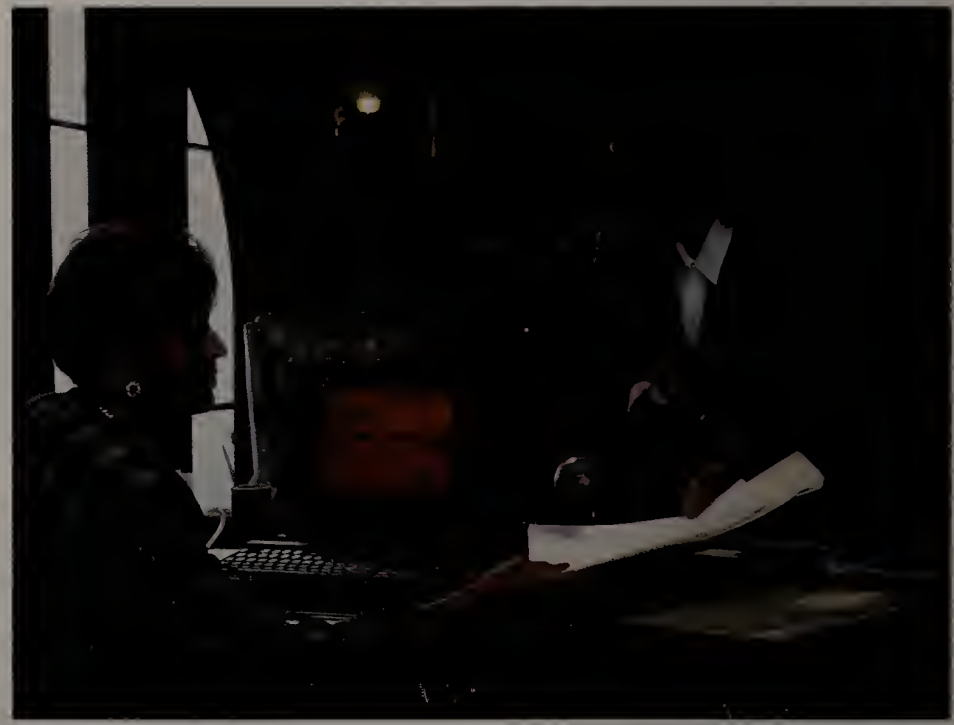
Okay, let's suppose you suddenly discover your company filled with powerful Toshiba Portable Desktops.

Now what?

First of all, your people can do everything around the office they've been doing with their desktop computers.

Giving your people instant access to vital information can keep them doing what they do best. Working smart.

Then your key employees can turn after-hours time into productive time, since their dining room tables and breakfast nooks can serve as off-site workstations.



Employees can even improve their productivity in the familiar surroundings of their own office. Only now they'll have more desk space to work with.

Your top people can add impact to their presentations with a wealth of information and computing power at their fingertips. And the story can repeat itself—with equally impressive results—everywhere from an office 3,000 miles away to a conference room that's a mere 30 feet down the hall.

To get more information or a free Portable Desktop productivity survey, call 1-800-477-1616.

WHERE DO YOU GO FROM HERE?

Giving your key employees a Portable Desktop means they'll have the flexibility to work when they need to, where they want to.

And yes, all that productivity can even take place within the confines of your own office desk (while using up considerably less of your desk space, we might add).

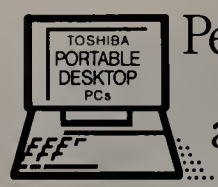
When people have access to computing power outside their office, presentations are more powerful and groups are more productive.

All of which leads us to one very powerful observation.

Now all of your best people can be doing a better job than they ever could when they were chained to conventional desktop PCs.

Better yet, they can do it without sacrificing power, functionability or expandability. Or anything else, for that matter.

THREE POWERFUL ARGUMENTS WHY YOUR NEXT



People said it was just a matter of time before someone built a line of portable PCs this powerful. They just didn't know it would happen so soon. With our Portable Desktops, we've successfully combined the power and functionality of desktop PCs into slim, portable packages that give you everything you need to get ahead in business.

T5200

18.7 pounds, 20MHz 80386 with 80387-20 coprocessor socket, 2 internal IBM-compatible expansion slots, 40MB hard disk with 25msec access or 100MB hard disk with 25msec access or 200MB hard disk with 16msec access, 2MB RAM expandable to 14MB, gas plasma VGA display with 16 gray scales, 1.44MB 3½" diskette drive.

T5200C

18.9 pounds, 20MHz, 80386 with 80387-20 coprocessor socket, 2 internal IBM-compatible expansion slots, 200MB hard disk with 16msec access, 2MB RAM expandable to 14MB, passive matrix VGA full-color screen, 1.44MB 3½" diskette drive.

DESKTOP PC SHOULDN'T BE A DESKTOP PC.

So you get the same power. The same functionality. And the same expandability it takes to keep pace with your company's needs. The big difference is that with a Toshiba Portable Desktop, you can easily turn all that power into increased productivity. All thanks to something no desktop PC could ever hope to offer.

The freedom to take it with you.

To get more information or a free Portable Desktop productivity survey, call 1-800-477-1616.

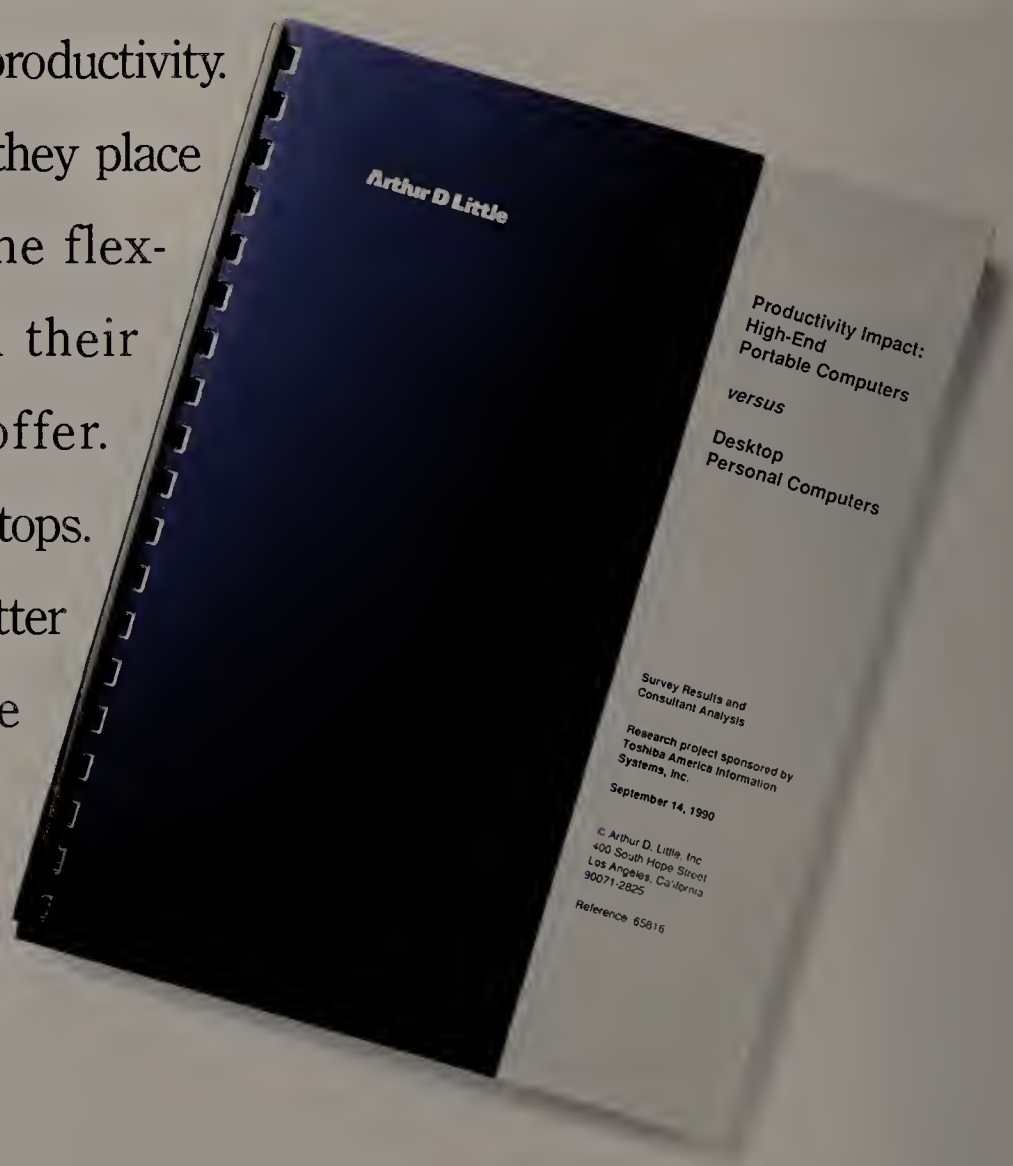
T3200SX

17.0 pounds, 16MHz 80386SX with 80387SX-16 coprocessor socket, 2 internal IBM-compatible expansion slots, 1 dedicated modem slot, 5 built-in ports, 40MB hard disk with 25msec access or 120MB hard disk with 19msec access, 1MB RAM expandable to 13MB, gas plasma VGA display with 16 gray scales, 1.44MB 3½" diskette drive.

DON'T TAKE OUR WORD FOR IT. GET A SECOND OPINION.

What do other companies know about our Portable Desktop PCs that you don't? If you had a copy of our free productivity survey, you'd know. For example, you'd know that 93 percent of portable users said that they'd never go back to using a conventional desktop. You'd know they've reported substantial increases in productivity. And you'd know why they place so much value on the flexibility and freedom their portables have to offer. Toshiba Portable Desktops. They're no longer a matter of convenience, they're a matter of survival.

To get more information or a free Portable Desktop productivity survey, call 1-800-477-1616.



In Touch with Tomorrow

TOSHIBA

Toshiba America Information Systems Inc., Computer Systems Division.

© 1990 Toshiba America, Computer Systems Division. Productivity information based on results from the 1990 Arthur D. Little Productivity Survey.

UPDATE

New Versions of Your Favorite Products

Corel Draw 2.0

Corel Draw 2.0 gives you more tools with which to create a sense of depth, 3-D effects, and color blends in your drawings, as well as an additional 51 fully scalable outline typefaces.

The first major revision to *Corel Draw* adds several innovative graphic manipulation tools, including one that lets you distort an object for a fish-eye or vertical arch effect, and another that gives a sense of depth to images.

Version 2.0 lets you extrude objects for a 3-D effect or gradually blend the shapes and colors of discrete objects together. Among other changes to the *Windows 3.0* program are 51 additional scalable outline typefaces (for a total of 153), any of which can be exported as Adobe Type 1 fonts. Registered users can upgrade to the $695 *Corel Draw 2.0* for $99. Corel Systems Corp., Corel Bldg., 1600 Carling Ave., Ottawa, Ontario, Canada K1Z 8R7; 613/728-8200.

Reader service no. 636

OmniPage Professional

OmniPage, one of the top optical character recognition packages on the PC, has turned pro. *OmniPage Professional* bundles in previously separate utilities to check spelling and for reading dot matrix text and adds a deferred mode that lets you scan pages now and process them later. The program's new verification window can display a bit map of the scanned page alongside the recognized text for easier error correction. *OmniPage Professional* retails for $995. Caere Corp., 100 Cooper Ct., Los Gatos, CA 95030; 800/535-7226, 408/354-2743 (fax).

Reader service no. 637

RealWorld Accounting and Business Software Version 6.0

Version 6.0 of *RealWorld Accounting and Business Software* gains dozens of features and faster performance. RealWorld claims that reports print twice as fast as in version 5.0 and that you'll be able to navigate pulldown menus more easily. Other new features include the simplification of multicompany consolidations, and the ability to add *1-2-3* and *WordPerfect* to *RealWorld* menus for quick access from within the accounting package. Prices for individual modules start at $695. RealWorld Corp., 282 Loudon Rd., P.O. Box 2051, Concord, NH 03302-2051; 800/678-6336, 603/224-1955 (fax).

Reader service no. 638

CA-SuperProject 2.0 for DOS

Mouse support for a character-based graphical user interface and enhanced graphics and reporting capabilities make *CA-SuperProject 2.0* easier to use. Pulldown menus and pop-up dialog boxes simplify things, while enhanced PERT, Gantt, and work breakdown charts give you greater flexibility. *CA-SuperProject 2.0 for DOS* has low-end scheduling capabilities as well as sophisticated project management. It retails for $895; there are various upgrade plans. Computer Associates Int'l, 1240 McKay Dr., San Jose, CA 95131; 800/531-5236.

Reader service no. 641

Market Manager Plus 3.0

Market Manager Plus, a stock portfolio manager that gathers quotes and market news from the Dow Jones News/Retrieval service, now alerts you when there is news about one of the securities in your portfolio—whether stocks, bonds, options, mutual funds, or treasury notes and bonds.

Version 3.0 of *Market Manager Plus* offers easier ways to track dividend reinvestments and lets you create historical reports on dividends and interest, even transferring them to your word processor or spreadsheet. Version 3.0 of the $299 program also gives you greater flexibility in classifying and reporting on the different types of securities. Dow Jones and Co., Inc., P.O. Box 300, Princeton, NJ 08543-0300; 609/520-4641, 609/520-4660 (fax).

Reader service no. 639

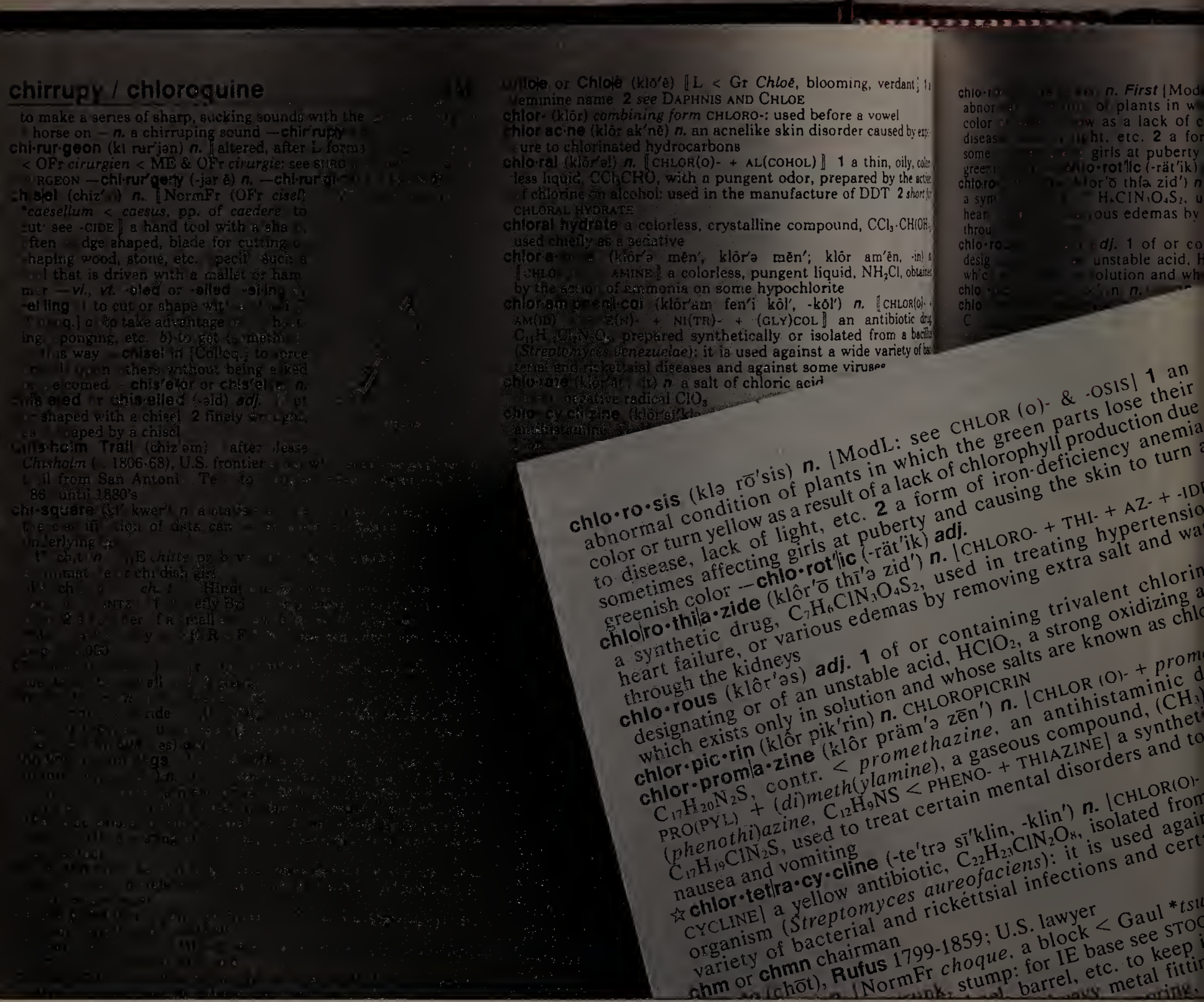
ToolBook for OS/2

Now you can develop graphical applications under OS/2 with the *ToolBook* software construction set. The object-oriented programming environment is 100 percent compatible with *Toolbook for Windows*, introduced in May 1990 with *Windows 3.0*. OpenScript, the nonprocedural language that underlies both versions, lets you create highly graphical, highly modular applications simply by combining reusable objects—chunks of code, graphic images, even video sequences. *ToolBook* can take advantage of OS/2 Dynamic Link Libraries to access external devices, communications programs, and applications such as *Microsoft SQL Server*. Priced at $395, *ToolBook for OS/2* comes with several predesigned applications. Asymetrix Corp., 110 110th Ave. NE #717, Bellevue, WA 98004; 800/624-8999.

Reader service no. 640

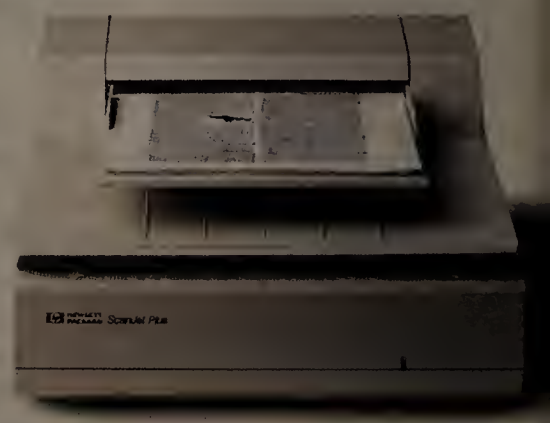
For more information about any product, contact the manufacturer or circle the number on the reader service card.

With HP's enhanced OCR capabilities,



Now you can take a page of this. A paragraph of that. Combine them with a few images. And quickly come up with one very impressive document. The HP ScanJet Plus scanner can read everything from a magazine article to a balance sheet. Then it stays on the job so you can easily fine-tune, or make major changes to, everything you've scanned.

The affordable, 8-bit ScanJet Plus is supported by a wide variety of third-party OCR and graphics software packages. HP's optional



it's easy to make chocolate moose.

text scanning software, AccuScan, simplifies the scanning process by recognizing the layout of even the most complicated material. Including multi-column pages and numerical tables. AccuScan automatically separates text from graphics, making it easy for you to pick and choose the information you want. An optional twenty-page automatic document feeder makes you even more efficient.

The ScanJet Plus gives you a head start. With one-button automatic text scanning. Live preview for instant feedback on image quality. And auto exposure, which works like a point and shoot camera. To make things even easier, it features on-line help.

HP has added all these impressive capabilities to a scanner known for its superior image scanning. The ScanJet Plus reads 256 levels of gray for smooth shading and more realistic graphics.

At only $2,190* the ScanJet Plus makes perfect sense for any business interested in being more productive. And more professional. For more information and the name of your nearest authorized HP dealer, call **1-800-752-0900, Ext. 1666.** And even if you never make chocolate moose, you'll have a recipe for success.

HEWLETT PACKARD

*Suggested U.S. list price without document feeder. © 1990 Hewlett-Packard Company PE12036

33-MHz 486s: Ultimate PC Power

These five screamers are among the fastest—and the costliest—systems you can buy. We pick the best of the lot and answer the obvious question: Who needs this much power?

Lincoln Spector

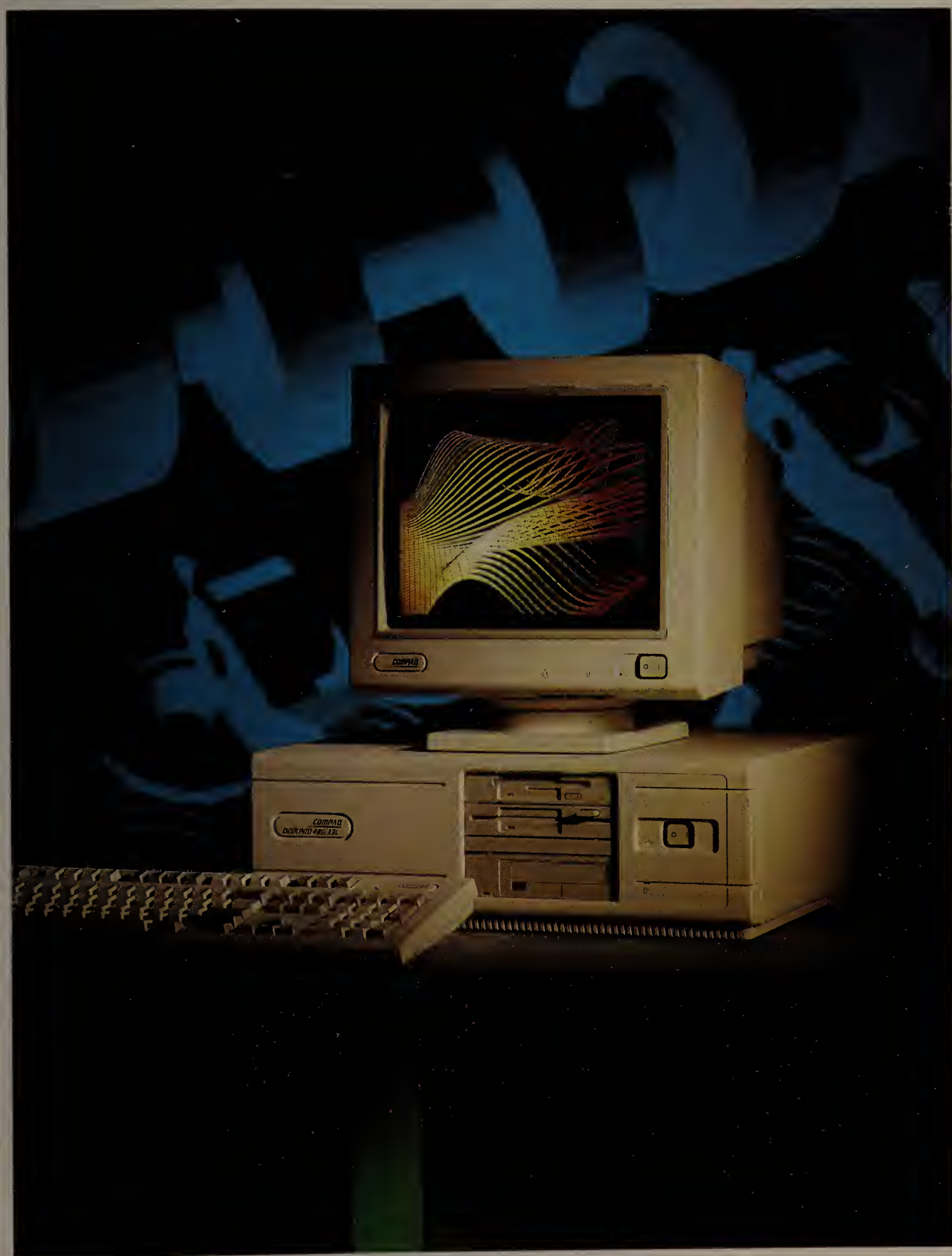
The fastest and most powerful PCs today are built around the 33-MHz 80486. With an internal 8K memory cache, a built-in math coprocessor, and the ability to handle most instructions in fewer clock cycles than the 386, this latest Intel chip is a speedster. For applications that rely heavily on the CPU, such as *1-2-3* and *AutoCAD*, our tests show that 33-MHz 486 systems ran an average of 31 percent faster than 25-MHz 486s and 88 percent faster than 33-MHz 386s. In tests involving disk-intensive applications like *dBASE IV* and *Paradox*, 33-MHz 486 systems averaged 39 percent faster than 25-MHz 486s and 41 percent faster than 33-MHz 386s.

That's a substantial gain, but is it enough to justify the high price? A 33-MHz 486 system can cost $1000 more than a similarly configured 25-MHz 486 and $2000 more than a 33-MHz 386. Is it worth the premium? See the accompanying story, "To 486 or Not to 486," for some buyers' opinions on upgrading to the 486.

Just what is a 486 good for? Thanks to the chip's built-in 387 capabilities, it excels at any job that makes use of a math coprocessor. Computer-aided design and engineering, for instance, require a tremendous amount of CPU activity and all but demand a math coprocessor. And while a fast 386 or slower 486 is sufficient for most spreadsheet users, anyone working with huge worksheet models—especially those that involve extensive trigonometric or financial functions—will appreciate a 486/33.

A 33-MHz 486 isn't a cost-effective choice for a file server. Since CPU speed has only a minor effect on network server performance, and math coprocessor abilities are completely irrelevant, the performance gains will be minimal. You'll do better to buy a 386/33 or 486/25 and spend the savings on more RAM and an even faster hard disk.

That isn't the case if you're running a multiuser application that supplies processing services for the whole network, such as a SQL data base, either on the file server PC or (as is usually recommended) on a separate PC. Then a 486 makes sense. Such "application servers" depend heavily on the CPU—and use the coprocessor—as they process queries from multiple workstations. Application servers are not yet in common use, but if you're setting one up now, a 486/33 is a good choice.



The Best Buy Compaq Deskpro 486/33L is small yet expandable. And it's the fastest in a fast field.

JOHN GREENLEIGH

FEATURES EVALUATION

Compaq's Expandable Desktop

The Compaq Deskpro's drive-array support, EISA expansion bus, and feature-laden motherboard help earn it a Best Buy.

● Yes
○ No

	ALR PowerCache 33/4e	Compaq Deskpro 486/33L	Dell System 433E	Everex Step 486/33
Standard features				
Street price[1]	$13,502[2]	$14,561[3]	$9799[4]	$8303
List price[1]	$15,473[2]	$16,499[3]	$9799[4]	$10,987
Weitek 4167 coprocessor socket	●	●	●	●
Memory coche[5]	●	●	○	●
Built into motherboord				
Floppy disk controller	●	●	○	○
Hord disk connector	○	[6]	○	○
Mouse port	●	●	○	○
VGA	○	●	○	○
CPU-speed RAM				
Copocity	128M8	100MB	16MB	64MB
Expandability				
8/16/32-bit slots/number free	6/5 EISA	7/6 EISA	6/6 EISA	0/0
8/16-bit slots/number free	1/0 ISA	0/0	2/0	6/4
8-bit slots/number free	1/1 ISA	0/0	0/0	1/1
Drive boys[7]	6[8]	7[9]	5	5
Lorgest hord disk option	1.2G8	840MB	650MB	680M8
Supports drive arrays	○	●	○	○
Design				
Front-ponel on/off switch	○	●	○	○
Front-ponel reset button	○	●	○	●
Service and support				
Worronty period (months)	12	12	12	12
Free on-site service	○[10]	●	●	●
Toll-free support number	○	●	●	○
Doily support (hours)	9	●	15	11
Weekend support	○[10]	●	●[11]	○
Electronic BBS	●	●	●	●
		BEST BUY		

[1] Except as nated, price based an 8MB RAM, 300MB ar larger hard disk, 1.2MB (ar 1.44MB 3½-inch) flappy drive, VGA and calar VGA manitar, at least ane parallel and twa serial parts ar ane serial part and ane mause part, 101-key keybaard, mause, and DOS 3.3 ar later versian. If the vendar daesn't affer a mause, we added $99 ta the street price and $125 ta the list price ta represent the cast af a basic Micrasaft Mause.
[2] Includes 330MB hard disk and 800 by 600 super-VGA adapter.
[3] Includes 350MB hard disk.
[4] Includes 330MB hard disk.
[5] Other than the 8K cache built inta the 486 chip.
[6] 320MB and 650MB drives and all drive arrays use advanced ESDI cantraller in expansian slat.
[7] Half- ar third-height drives.
[8] One bay supparts anly 3½-inch hard drive.
[9] Using Campaq drive arrays.
[10] Optianal thraugh Intel.
[11] Saturday 8–4.

JOHN GREENLEIGH

Requirements for Power

No matter why you buy a 33-MHz 486, the key buying issue is speed. When it comes to performance, the systems reviewed here range from magnificent to fantastic, with few significant differences. But when a system is querying data for an entire network or helping you design buildings, you'll want it to eke out every last bit of speed.

Drive capacity is almost as important, because CAD and especially application servers need plenty of room. Fortunately, all these machines are highly expandable, but only Compaq offers drive-array technology to speed up drive I/O and add data integrity for servers (see the Deskpro review in this roundup for a discussion of array technology). A large RAM capacity is also desirable (for more details on how to evaluate a 33-MHz 486, see the sidebar "Buying Smart").

It's worth noting that all but one of these systems use Extended Industry Standard Architecture (EISA), which, like the Micro Channel, offers more throughput than the good old AT bus. As devices emerge that take full advantage of the EISA bus, these systems will

A swinging arm gives you easy access to the ALR PowerCache 33/4e's insides.

BUYING SMART

If you're going to pay for the best, you'd better make sure you get it. Whether you're planning to use your 33-MHz 486 for CAD, as a file server, or to process data for an entire network, try for a fast machine that never lacks for slots or hard disk bays.

PERFORMANCE

Speed is the reason you buy a 486, and speed is what you should expect. Judging the performance of these five computers is like grading a test on a curve when no student scored below 98 percent; everyone did great. But when you want that last bit of speed, even a small difference is important.

EXPANDABILITY

Your CAD workstation may need access to a plotter, a color printer, a digitizer, a fax board, and a network card, so the more free slots you have, the better. Look for at least five. The same goes for a file server. The number of slots isn't as important in an application server, which may need only a drive controller and a network card.

Whatever the application, you should consider a 32-bit expansion bus like EISA or the Micro Channel that is capable of *bus-mastering*—letting separate processors on expansion cards control the bus (all but the Everex unit offer EISA, but none offers MCA). CAD users may need bus-mastering for future high-performance graphics boards, and SQL server administrators will want the fastest new storage controllers.

For application servers, and to a lesser extent CAD, huge data storage is a necessity. For CAD, look for five half-height drive bays, two of which can hold one full-height drive. For an application server, look for six drives, since a second, smaller hard disk improves performance.

Compaq offers proprietary disk arrays with its two 486 models to speed disk access and/or increase security. A disk array is simply two or more hard disks acting as one, thanks to a special controller and synchronized drives. For instance, a two-drive array can split your data, writing half of it to each drive in half the time. Or that same array can write all the data to both disks, ensuring against data loss if one crashes.

RAM CAPACITY

No computer today can hold the full 4 gigabytes of RAM the 386 and 486 can address, and few users can imagine needing more than 16MB. But new 32-bit operating systems like NetWare/386, as well as future versions of OS/2, will read as much RAM as any current computer can give them. These operating systems are the usual platforms for application servers, and you'll want to take full advantage of them. If you want to be using your application server three years from now, look for a system that can hold at least 32MB.

DESIGN AND CONSTRUCTION

Ergonomic considerations are more important if you plan to use the system as a desktop workstation rather than as a server. A small footprint will save room on your desk, and a front-panel on/off switch and reset button will make life easier. An LED display is handy when diagnosing trouble.

PCs should be user friendly on the inside as well. The harder it is to install RAM, a graphics card, or a new hard disk, the more time or money your tech support staff will spend doing it, and the more risk there will be of damaging the system. Look for a solidly built computer with plenty of finger room around the screws, cable connections, and drive bays.

While a good keyboard and monitor are always important, they're not considered in this review. If you plan to use your 486/33 as a CAD/CAM workstation, you'll probably use a specialized, third-party monitor. For a server, a simple monochrome display will do. And if you don't like the keyboard on your new $15,000 computer, you can replace it for about $50 to $100.

SERVICE AND SUPPORT

The services you get with your computer are as important as the technology inside it. Good telephone support, preferably toll free and available on weekends, goes a long way in supplementing dealer support. Free or cheap on-site service is essential for a server. A long warranty not only protects you from future problems but speaks well of a manufacturer's confidence; make sure it runs at least a year.

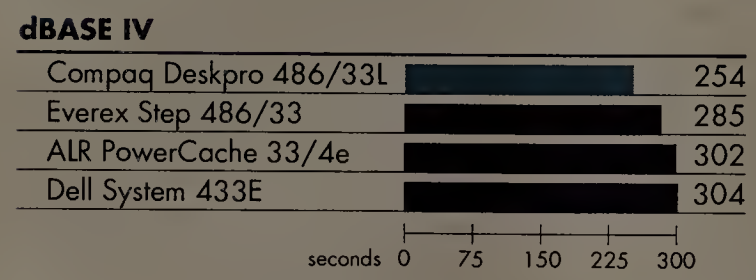
When it comes to technical support, the vendors' stated policies are only half the story. To get the other half, we called the vendors' technical support departments in the morning, early afternoon, and late afternoon to find out how easy it is to talk to a technician. Where the vendor doesn't offer technical support, we called a few dealers to see how well they support the system. —*L. S.*

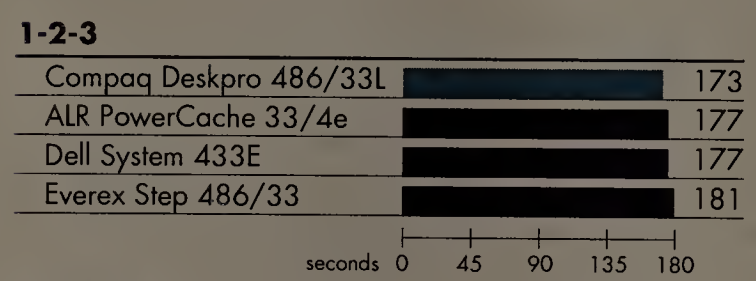
PC WORLD TEST REPORT

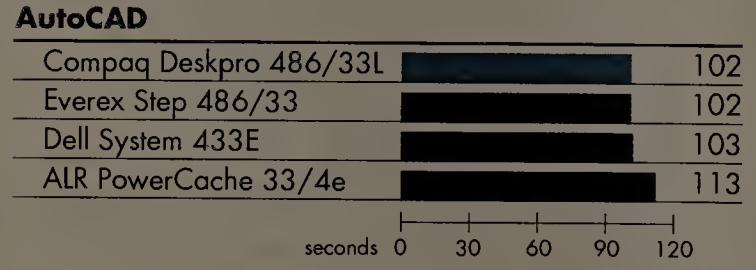
The Deskpro 486/33L Pushes the Envelope

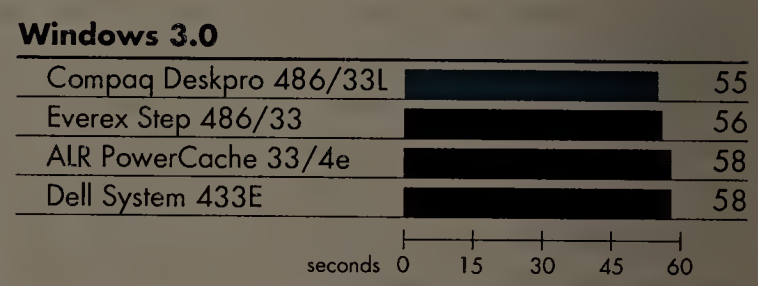
With machines this fast, a slight edge in performance makes a noticeable difference only with big jobs—as shown below. The Deskpro 486/33L's strong dBASE showing pulls it ahead of the pack.

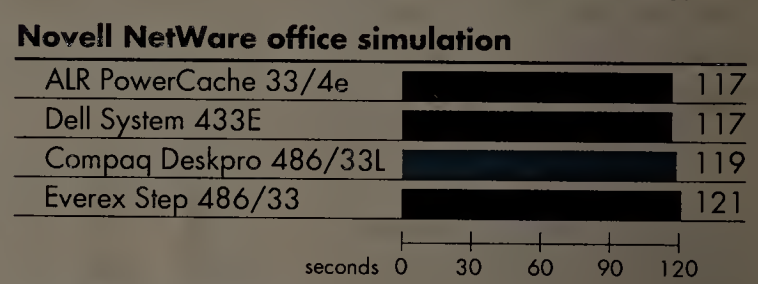
Best Buy

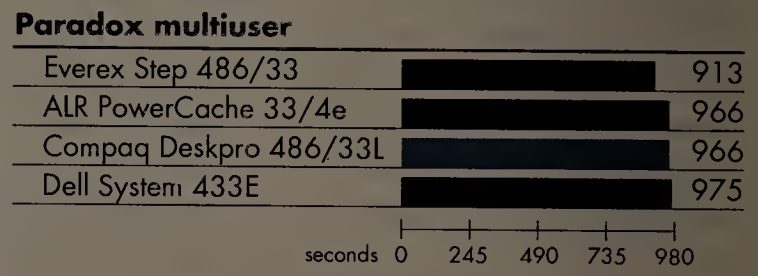












Methodology
All the computer systems were tested with 8MB RAM. Every computer was tested with the vendor's version of DOS, and the systems had the following hard disk configurations: Everex Step 486/33, 300MB; ALR PowerCache 33/4e and Dell System 433E, 330MB; and Compaq Deskpro 486/33L, 350MB.

dBASE IV 1.1
With the caching feature enabled, the time is measured to complete an unindexed search for a single record in a 100,000-record parts table. Then the table is indexed, the transaction processing module is run, and 600 records are posted.

1-2-3
The *1-2-3 2.2* test measures the time required to complete the following operations: The application is loaded. Then three separate worksheets (arithmetic, financial, and scientific) are loaded, and various changes are made and recalcs run on each. Subsequently the *MAPS* add-in from Management Advisory Services is used to run a number of financial forecasts.

AutoCAD
The time is measured for *AutoCAD* release 10 to load a 500K drawing, mask layers, change zooms, and remove the hidden lines.

Windows 3.0
Timing begins and ends at the DOS prompt. *Windows* is launched along with a macro that loads *Microsoft Excel* and a financial worksheet and initiates a recalc. Then the macro loads Samna's *Ami Professional* along with a 50K document, in which is placed a 500K TIFF image. Finally, the macro launches *Micrografx Designer*, opens a drawing, displays it on screen, and exits to DOS.

Novell NetWare office simulation
Each of 24 workstations runs one or two of the LAN applications *WordPerfect 5.1*, *1-2-3 2.2*, and *Paradox 3.0*, accessing the tested computer as a Novell NetWare file server. Typical files in various sizes are loaded, and operations are performed with delays interspersed to simulate normal use, but only operations that access the server's hard disk are measured. Every workstation also occasionally copies files to and from the server. Finally, the times are averaged and totaled.

Paradox multiuser
Paradox 3.0 multiuser version is used for this test with 24 workstations. On each station, starting with an orders table, 50 records are compared with an available stock table where the current prices for items are found, and the resulting records are inserted into an invoice table. The result represents an average of the 24 times.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

have an edge over standard PCs—especially when used as application servers. For now, however, the EISA bus has little effect on performance.

We looked at five 33-MHz 486s to find out which is the best for you. We priced the systems based on the same configuration used for our performance testing: 8MB of RAM, a 300MB hard disk, a mouse, and VGA color graphics. Since list prices bear little resemblance to what you'd actually pay, we obtained and averaged street prices from more than one hundred resellers in major PC markets across the country.

What did we find? Compaq's Deskpro 486/33L wins Best Buy honors for its blazing speed and outstanding expandability.

ALR PowerCache 33/4e

PROS: Good construction, roomy interior

CONS: Relatively slow CAD performance

ALR's PowerCache 33/4e is a roomy tower with plenty of hard disk space. Fast by any other standards, its *AutoCAD* performance is slow compared to that of the other systems in this roundup. Still, at an average street price of $13,502, the PowerCache is a good value for a server.

If you lack on-staff technical expertise, you'll appreciate how easy the ALR is to upgrade. Thanks to its large thumbscrews, you can open the PowerCache without tools, although you'll still need a screwdriver to get at some internal parts. The full-height drive bay is mounted on an arm that swings outward for easy access. You won't have to worry about outgrowing the ALR—you can fill it with two floppy drives, a tape drive, and a full-height hard disk and still have room for an extra 3½-inch hard drive.

On paper ALR's support policies look pretty good, but in practice they're a major disappointment. You get phone support, but it's your dime and available only on weekdays. Lassoing a technician can be a challenge; our tests yielded seven busy signals, a promise that a technician would call us back (no one did), and one successful contact—after 12 minutes on hold. On-site service and weekend support are available through Intel at varying costs.

The PowerCache's relatively slow *AutoCAD* results make it less attractive than the other systems as a CAD workstation. And although that extra drive bay would seem to position it as an application server, hit-and-miss technical support makes this proposition questionable.

JOHN GREENLEIGH

Contained in a standard AT-style case, the Dell 433E is the least expensive EISA system reviewed. But it's the only system here that can't take you past 16MB of CPU-speed RAM.

Compaq Deskpro 486/33L

PROS: Top speed, compact size

CONS: Expensive

While the Compaq Deskpro 486/33L's blazing performance, excellent slot count, and drive-array options make it suitable for server use, its relatively small footprint makes it right at home on your desktop as well. Despite its high $14,561 street price, it's your all-around 486 Best Buy.

Compaq's optional drive-array technology should speed access and provide data integrity in multiuser applications (drive arrays are of no use in a workstation). For instance, you can hook two 210MB drives together in an array to gain either a very fast 420MB drive or a single 210MB drive that guards against disk failure by writing the same information in two places. A four-drive array is also available, providing 840MB of storage if data is written to all four drives. Optionally, you can sacrifice some speed and a quarter of your capacity by using one drive for data integrity and error correction. In this mode, any one of the four drives can conk out without losing data or even slowing down the system. The drive arrays require special and expensive hard disks distributed through Compaq.

Even without using drive arrays, the Deskpro beats the competition in most of our speed tests, especially the disk-intensive *dBASE* benchmark. The smallest machine in the bunch, the 486/33L still has room for seven EISA slots, six of them free. The Deskpro has one internal drive bay, located behind the three floppy bays, which can hold one full-height drive, two half-heights, or up to four of Compaq's proprietary array drives.

EXECUTIVE SUMMARY

Compaq Deskpro: Best 486/33

The Deskpro 486/33L is fast, expandable, and well designed.

These 33-MHz 486s are the fastest PCs around—so fast, only such heavy-duty applications as CAD, huge spreadsheets, and SQL data bases can tax them. Big jobs like these demand lots of memory and storage.

Compaq's **Deskpro 486/33L** wins Best Buy honors for its expandability, fast performance (even without the optional drive arrays), high RAM capacity, and well-thought-out design. Coming in second is the inexpensive but well-supported **Everex Step 486/33.**

	AIR PowerCache 33/4e	Compaq Deskpro 486/33L	Dell System 433E	Everex Step 486/33
Performance	Fair	Excellent	Good	Good
Expandability	Excellent	Excellent	Good	Good
CPU-speed RAM capacity	Excellent	Excellent	Good	Excellent
Design and construction	Good	Excellent	Good	Good
Service and support	Poor	Fair	Excellent	Excellent
Price	Good	Fair	Excellent	Excellent
Overall value	Good	Excellent	Good	Excellent
		BEST BUY		
Reader service no.	615	616	618	619

How we rate 33-MHz 486 systems We rate these systems based on information in the Features Evaluation and the PC World Test Report, combined with our opinions of quality, reliability, and user benefit.

Performance is the only reason to buy a 486, so you'll want the fastest computer you can buy. When we compared our benchmark results, we gave extra weight to the *AutoCAD*, *1-2-3*, and Novell NetWare tests.

Expandability covers the number and kind of free slots available, as well as the number of drive bays and the capacity of hard disks available for them. An Excellent rating requires five open slots and either five half-height drive bays or built-in drive-array support.

CPU-speed RAM capacity refers to the amount of RAM installable on the motherboard or through a fast, proprietary memory card. To win an Excellent, a system must accept at least 32MB of fast RAM.

Design and construction describes the quality of the computer's manufacturing, the accessibility of controls, and how easy it is to work inside the computer. To earn an Excellent rating, a system must be well built, include a front-panel on/off switch, and have no major design flaw.

Service and support includes the length of warranty and the quality and availability of phone support, documentation, and other services. To determine the quality of telephone technical support, we called each vendor's support line at three different times during the workday. At least one year's full warranty, free on-site service, long support hours, and effective response to our test calls are required for an Excellent rating. Extra credit is given for toll-free and weekend technical support.

Price ratings are based on a survey of more than a hundred retail stores across the country, from which we determined the approximate cost you would pay for one of these computers.

Overall value is averaged from all of the above criteria, with special emphasis placed on performance and expandability.

The Deskpro is well designed, with a convenient front-panel on/off switch and an interior that—despite its small size—is remarkably easy to work in. You can easily replace the special card that holds the Deskpro's processor, and you can install up to 100MB of fast RAM on another proprietary board. Unfortunately, Compaq uses its own costly memory modules, not standard SIMMs. Compaq charges $1598 for two 2MB modules; Dell, in contrast, asks only $399 for 4MB of SIMMs.

Compaq has a reputation for dependable computers that need a minimum of service. But if you do have problems, you'll have to rely on a dealer for support. Compaq requires that dealers know its systems, but depending on dealer support is risky. When you're running mission-critical applications on a complex machine, you need guaranteed quick and effective service or, failing that, a direct line to the manufacturer. For that reason, we rate the Deskpro's service as only fair.

If you want an exceptionally fast and powerful machine for CAD work and you can afford to pay for the privilege, the Deskpro is the Best Buy. And the drive-array capabilities make it the best choice for all but the biggest servers.

Dell System 433E

PROS: Low price, great service

CONS: Limited expandability, 16MB RAM ceiling

If a low price for an EISA-based, 33-MHz 486 is a high priority, Dell's $9799 System 433E is for you. But the 433E is not as expandable as most of the competition, and its 16MB limit on CPU-speed RAM may be low for some multiuser applications.

The 433E offers plenty of desktop power, but don't count on it as an infinitely expandable server. Its AT-style chassis is limited to five half-height drive bays, two of which can combine to take a single full-height drive. Also, while a 16MB ceiling on CPU-speed RAM is plenty now, 32-bit operating systems like NetWare 386 and future versions of OS/2 will make higher capacities desirable in the next few years.

The unit we looked at had tracer wires on the motherboard, a sign of a design not quite ready for prime time. Dell assures us that the units being sold at press time have no such rough spots.

Dell's unequaled service and support

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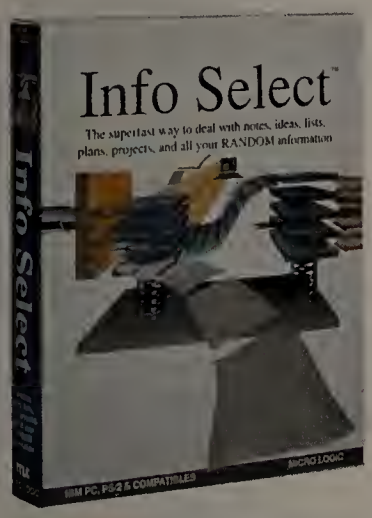
"the most useful software program I have ever owned." Steve Gibson, InfoWorld

Surprisingly, there is a whole new world of uses for your computer! You can use your computer to deal with all the countless bits of "random" information scattered across your desk: plans, notes, lists, actions, contacts, ideas,



and much more. INFO SELECT™ will not only give you instant access to this important information ... it will help you make better decisions and see important new relationships. Try INFO SELECT risk-free and discover a whole new dimension of computing.

Photographic memory

INFO SELECT is like having a 'photographic memory' that gives you perfect superfast recall of up to 64,000 items of information.

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When Harry calls you on the phone, you'll display the six windows on Harry before he finishes his first sentence! No more embarrassing pauses or scrambling for information.

INFO SELECT is easy to use - yet powerful.

INFO SELECT also includes the world's first "3-D" word processor. You'll be amazed at how it works.

Instead of one window or ten, imagine up to 64,000! The uses are endless.

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Were you born with a memory situated squarely on the tip of your tongue? Do you forget things like which day you placed an order or important numbers? If you are forgetful you especially need INFO SELECT - the software that remembers almost everything for you.

Thinking tool

Have you ever worked on a complex project and felt lost? With INFO SELECT you'll group, scan, and cross search through all your notes so fast you'll see the big picture in seconds.

Will I be better off doing this now or that later? Keeping priorities straight can make or break your career or your business. INFO SELECT lets you keep on top of what's hot.

Should you use an east or west coast supplier? To make decisions you need facts. Now you can view the facts any way you like ... as fast as you can think. You'll make the best decisions ever -- and fewer expensive mistakes.

Phone notes

Client info

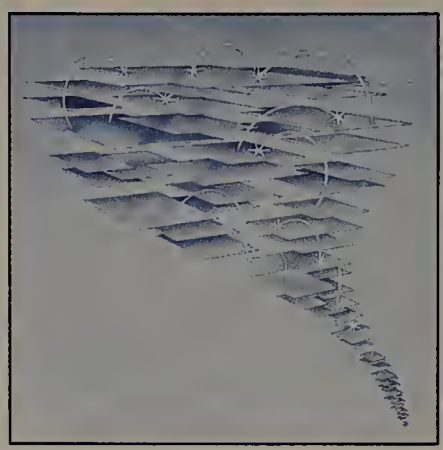
Decisions

Management

The #1 PIM

What's all the fuss about PIMs (Personal Information Mangers)? Simple - you probably have more RANDOM information than any other type and you need a PIM to properly handle this kind of information. The right PIM will save you time and make everything you do go smoothly.

Why is Info Select the #1 PIM? Because Info Select is based on ideas you can identify with - like stacks of paper. And it's free-form too. You won't waste days or weeks learning complex structures. Instead you'll be up and running in minutes. Info Select also does more and costs less than other PIMs.



Owners of our TORNADO software (symbolized by the famous "blue tornado") can trade up to the second-generation Info Select under our special offer. There are over 200 improvements.

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INFO SELECT is memory resident (if you choose), so you can quickly jump in from other programs. Info Select windows can hold: notes, plans, lists, facts, letters, contacts, and much more. You can search for a window or a group of windows related by a word or phrase. There are five ways to see overviews; hypertext, a fast sort, and line drawing. Save time with the dialer, date tickler; and searching by text or date ranges.

If you have notes, ideas, contacts or other unorganized RANDOM information, you need Info Select.

Info Select allows you to: add columns of numbers; store data in EMS; use template or free-form windows; import and export files, screens, and databases; move, join, and duplicate windows and much more.

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The new LAN version allows integrated E-mail, sharing company rolodexes and distributing company policies. You can share any kind of information. It's your first step into the exciting new world of groupware! Ask about the five node LAN starter pack.

Easy power

Info Select is easy to use yet offers the power you need with infobases up to 10 megabytes; text searches up to 700kb/sec; up to 32,000 characters per window; and up to 64,000 windows per infobase. Even better, Info Select can swap down to as little as 7K memory!

TORNADO owners

INFO SELECT is based on the pioneering TORNADO™ software PC World called "Excellent, Excellent, Excellent, Excellent" and PC Magazine awarded Editor's Choice - twice. Call about our special trade-up offer.

Endless uses

Info Select can do much more than manage all your RANDOM information. Use it to manage business correspondence, sales leads, orders, and client notes. Track facts, plan projects, or interrelate all your ideas. You can catalogue parts, documents, and inventory items. Match buyers and sellers or doctors and patients. Setup an information desk. Edit E-mail. Store notes on magazine articles, software operation techniques, or just names and addresses. Whether you are a lawyer tracking court cases or a zoologist collecting feeding habits you'll find countless uses for Info Select.

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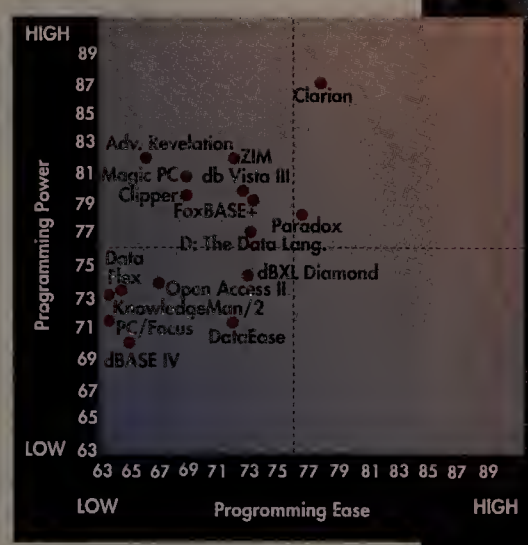

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INFO WORLD Clarion Professional Developer 8.2

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Circle 36 on reader service card

COMPAQ'S SYSTEMPRO: A BREED APART

Why have we separated the Systempro from the other machines in this roundup? Because it's designed for one purpose only: serving a network. Like the other systems in this roundup, the Compaq Systempro Model 486 offers a 33-MHz 486 CPU—but there the resemblance pretty much ends. With a whopping $19,954 street price (in the same configuration as the other systems reviewed), it's clear this machine has a special purpose.

This massive tower accommodates 11 drives, copious amounts of RAM, and two—count 'em, *two*—CPUs. Both the leading network operating systems, *LAN Manager* and NetWare/386, will eventually support the dual-CPU scheme: One CPU will handle file server tasks, while the other runs a server-based application (typically a data base). Difficult to set up and get going, this pricey file/application server is best suited for networks large enough to justify the price tag and installation effort.

In theory, dual processors should offer a performance gain, but they have yet to prove their worth in real-world, PC-based applications. UNIX has always exploited multiple CPUs, and the UNIX-based Banyan VINES SMP network operating system currently claims dual-processor support.

In the here and now, the Systempro's disk capabilities are extraordinary. Using Compaq's proprietary drive arrays, you can install up to eight drives in two four-drive arrays, giving you close to 1.7 gigabytes of blazingly fast storage or—if you're willing to sacrifice some speed and capacity for data integrity—1.26GB of only extremely fast storage. But only experts should attempt the difficult task of installing the Systempro's drives, and using standard, nonarray drives isn't recommended.

RAM expansion is equally spectacular; if you're willing to give up one of the two processors, the Systempro can hold 256MB of RAM. As with the Deskpro, you'll need Compaq's pricey RAM modules. With two processors, the Systempro can still accommodate 160MB of RAM—more than you're ever likely to need.

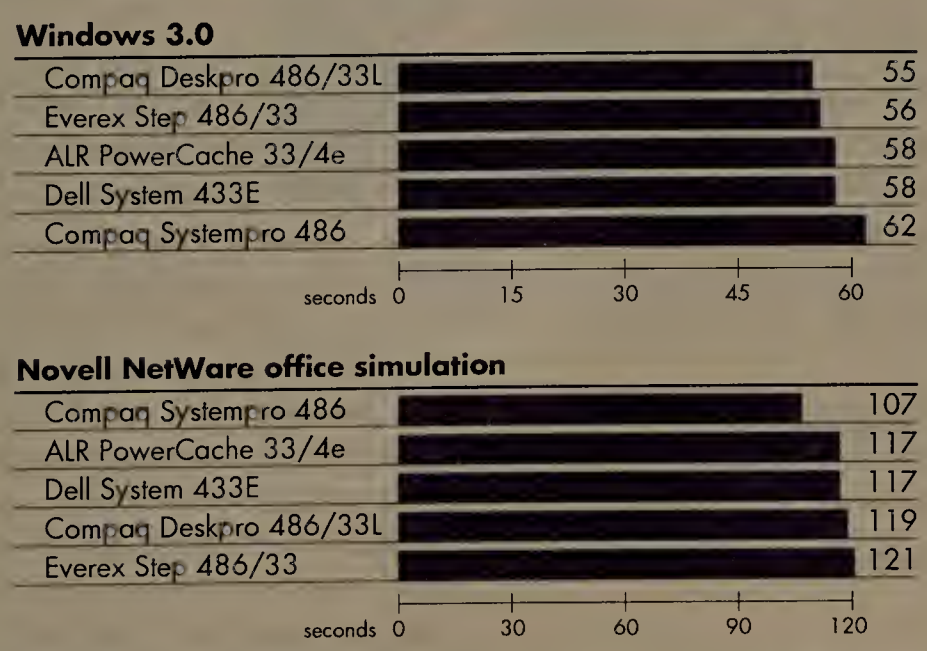
The Systempro's poor performance in the *Windows 3.0* test reflects its specialized design. For instance, the fast bus-mastering port in the proprietary drive-array controller doesn't support DOS (a slower "compatibility port" does), virtually guaranteeing slower performance in single-user tasks. But as our Novell NetWare office simulation tests show, when running a multiuser, 32-bit operating system, the Systempro races past the competition.

Warning: The Systempro is an extremely complex machine that should be set up only by an expert, and experts may be hard to find. As with the Deskpro, Systempro support is strictly dealer based, and its quality varies. When you've got a gigabyte or more of mission-critical data and a whole company depending on it, you don't want to be limited to dealer support.

If you need a bottomless pit of fast, reliable storage and have a bottomless pit of money to pay for it, the Systempro is worth considering. But make sure you've got a competent Compaq dealer in your area. —*L. S.*

WHERE TO BUY

Compaq Systempro Model 486
Compaq Computer Corp.
LIST PRICE: Model 486-420 with 8MB RAM, 3½-inch 1.44MB floppy drive, 420MB two-drive array, one parallel and two serial ports, one mouse port, VGA on the motherboard, 101-key keyboard $23,999; Model 486-840 same as Model 486-420 except with 840MB four-drive array $29,999
EXTENDED WARRANTY: through dealer
TECHNICAL SUPPORT: through dealer
OTHER SUPPORT: none
Reader service no. 617



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The fast, relatively inexpensive Everex Step 486/33 sports a front panel with a reset button, an LED diagnostic display, a speaker on/off switch, and a speed switch.

JOHN GREENLEIGH

should relieve you of any worries about not buying from a local dealer. You get free on-site service for the life of the warranty, a BBS, and a free, automated fax service that can provide you with most of the technical specs you'll ever need. The toll-free support number is staffed six days a week, 15 hours a day on weekdays, and every time we called a technician answered immediately.

Dell offers a solidly built, solidly backed machine at a low price. If you're confident you'll never need more than five bays and 16MB of RAM, it's a good choice for a high-end workstation.

Everex Step 486/33

PROS: Inexpensive, well supported

CONS: Limited expandability, no EISA support

Everex's Step 486/33 is similar to the Dell in performance and expandability, but it has two distinct advantages: It can take a full 64MB of fast RAM, and at $8303 it costs even less. Despite its lack of an EISA bus, it's an excellent deal as a CAD or spreadsheet workstation.

The Step 486/33 took first place in the multiuser *Paradox* transaction tests, a good indication of bus throughput on a network. But it came in last in the NetWare office simulation test, and as with the Dell, its standard, AT-style chassis with five half-height drives may be insufficient for serving a large work group. The standard AT bus is also limiting if you're running a large LAN.

The system's front panel conveniently offers a reset button, an LED diagnostic display, and a speaker on/off switch. There's also a handy but needlessly confusing speed switch, with 33-, 16-, and 8-MHz settings although the 486/33 lacks a 16-MHz speed.

Everex's technical support requires a toll call and can't be reached on weekends, but otherwise it's excellent. The technical support line is open 11 hours a day, on-site service is free, there's a BBS, and we never had to wait longer than 3 minutes to talk to a technician.

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Lincoln Spector is an assistant editor for PC World.

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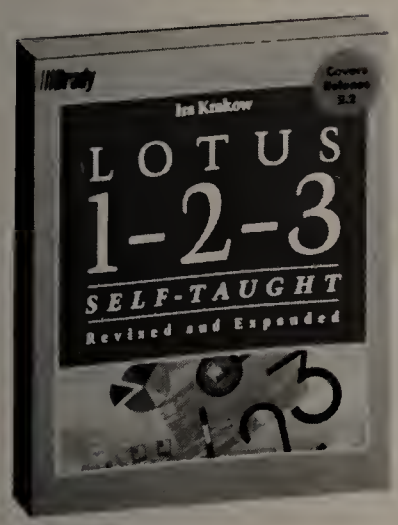

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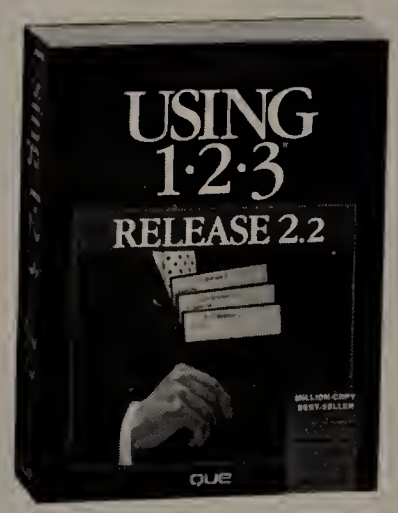

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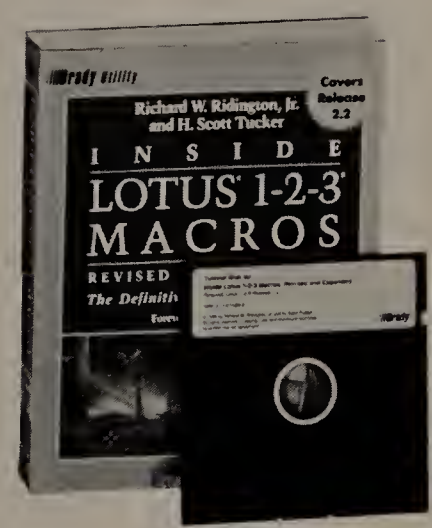

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Pro vs. Con: Are You Ready for a 486?

We asked two influential PC purchasers if they recommended moving up to a 486. Their lively debate will help you draw your own conclusions.

Alice LaPlante

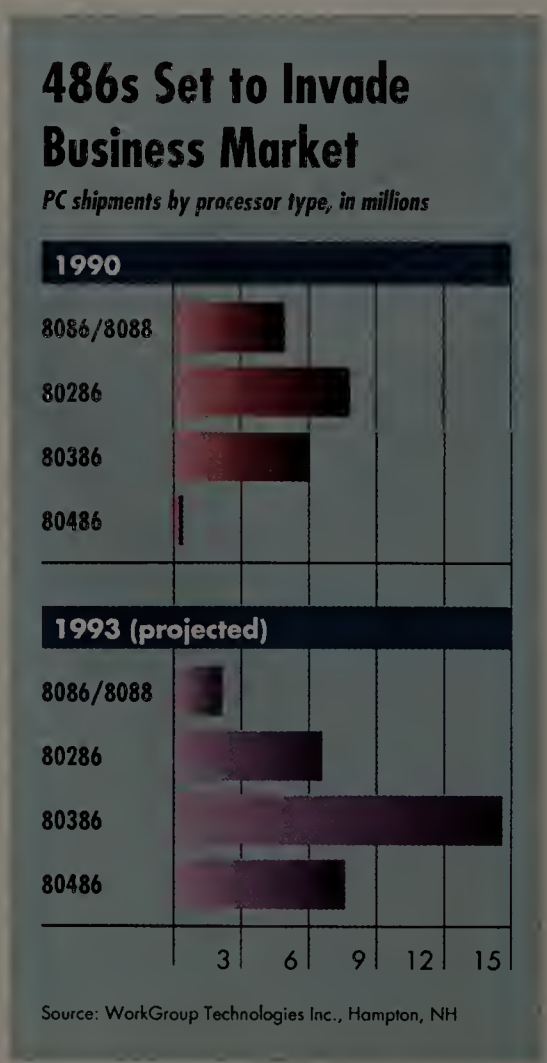
To be seduced by power is a very real hazard when buying systems—but it may also be an opportunity. Today's siren of the business world—the speedy 80486-based PC—is turning plenty of heads. But is it too much bang for too much buck? With the current economic downswing, many companies are cautious about expensive new technology. Buyers are considering purchases more carefully than in the freewheeling eighties, when the 80386 won surprisingly rapid acceptance.

If the 486 debate has yet to reach your office, it will soon. The 486 boosters argue that it's safer to buy too much —rather than too little—power and that faster processing can give users a competitive edge. They also claim that a more powerful CPU is needed for the SQL data base servers that have begun to arrive. Meanwhile, the 386 faithful point out that few applications need the MIPS and math coprocessing power of the 486 and that performance gains don't keep pace with the higher prices. Too expensive for desktop use, the 486, they argue, is also overrated as a network file server, since disk performance is more important than CPU speed for that purpose.

That's only the beginning of the debate. Below, two systems professionals face off.

Scary Price Tags

Like many PC buyers, Bruce Johnson, manager of PC technology at the New York–based law firm of Sullivan and Cromwell, is in no hurry to move up to the 486. Johnson evaluates, selects, and implements new technology, but he's also in charge of training and supporting more than 300 users—a task that brings a healthy dose of pragmatism to his purchasing decisions. "You can't ignore economic realities," counsels Johnson, who says he's concerned about the recession's effects on his company. "You have to consider whether an investment will have payback."



The real question for Johnson is not "486 versus 386," but rather "classic 386 versus 386SX." At the moment, he's having a hard time justifying the cost of full-blown 386 machines, and he's leaning toward cheaper SX systems. "I'm trying to allow for a decent system life span," says Johnson, "but the choice must fall in line with the financial realities of my company."

The Hidden Costs of Caution

Bob Holmes, manager of systems evaluation at Southern California Gas Company in Los Angeles, disagrees, pointing out that using old technology may involve hidden costs. "The tendency is to single-mindedly concentrate on cost without looking at parameters such as the value of human resources," says Holmes. He argues that too many companies skimp on buying the right PC tools and end up hobbling users' power and wasting their time.

"When it comes to manufacturing, most companies have a realistic idea of how the cost of goods sold relates to their overall financial health," says Holmes. "If that means they have to buy a million-dollar machine, they buy it." But businesses don't always apply that same logic when dealing with managers and other information workers, says Holmes, even when a more powerful PC generates greater productivity and higher-quality work. Few companies view white-collar work as "product," and those that don't fail to factor in PCs as part of the cost.

Johnson agrees that companies often overlook information workers, but he contends that when it comes to PCs, users are typically undertrained and overequipped. "Frankly, the average employee—in my case, an attorney—does not have the skills to fully use the power of a 486," says Johnson. Until 32-bit applications arrive, he says, even 386 machines will be underutilized.

"Companies doing CAD/CAM work or heavy number crunching could justi-

Have patience, argues Bruce Johnson of Sullivan and Cromwell—hold off buying a 486 until prices drop and problems are ironed out by others. You'll save money and have fewer frustrations that way.

Go for it, says Bob Holmes of Southern California Gas—the dramatic speed improvements of a 486 can translate directly into greater productivity for many users and will pay off the added system cost in time.

JONATHAN LEVINE

AMY ETRA

fy a 486 much sooner than we could," says Johnson, adding that Sullivan and Cromwell depends on PCs primarily for word processing and modest spreadsheet duty.

Holmes admits that applications exploiting the 486 are few and far between, but he argues that you can't overlook the importance of pure speed: "You have to look at which employees are making the most valuable contributions. Are they limited by the technology?"

New Technology: Leading Edge or Bleeding Edge?

Another critical issue is whether it makes sense to be on what many call the "bleeding edge" of technology. All too often, the first to invest in new technology in effect become beta testers for vendors, finding bugs and glitches that are fixed later.

"I'm not interested in doing missionary work," says Johnson, who points out that his support staff isn't big enough to track down and solve new and unique problems. "With new technology, you're basically on your own," he warns. Better to wait until glitches are fixed and prices drop.

Holmes concurs, but only up to a point. "The first wave of new products—particularly a new CPU—will probably have problems," he admits, "but that doesn't mean you should avoid all new technology." The more important question to Holmes is whether you're in danger of being stranded at a technological dead end, which he seriously doubts will be the case with Intel's 486.

Once you're confident that the world will follow in your footsteps, Holmes believes, you shouldn't look back. "If you buy too much power, you'll still be able to use it," he says. "But if you buy too little, you might not be able to do the job—and that's the end of the machine's economic life."

In response, Johnson argues that because PC technology moves so rapidly, you can avoid risky purchases and ultimately save money simply by holding off. "By waiting even six months, you can bypass some platforms completely," asserts Johnson.

Leapfrogging the 486 will take more patience than that—Intel's 80586 chip is probably a year away, and 586 systems probably won't be available until the end of 1992. Faster 50-MHz 486 systems should arrive by the end of this year, however.

For Holmes, even six months is too long to wait. "You can always wait until something better comes along, but you may end up waiting forever," he points out. "If we followed that argument, we'd still be writing with a stick on damp clay."

The arguments posed by Johnson and Holmes point to a middle course. Perhaps the best approach is to start small—invest in a few 486s now and give them to CAD engineers, graphic artists, financial analysts, or SQL data base gurus, and see if the investment pays off. By carefully measuring productivity and the users' satisfaction, you can decide how quickly you want to move forward. After all, the world didn't switch to papyrus in a day.

Alice LaPlante is a freelance writer in Palo Alto, California.

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Editor's Note:

When I first cracked open the box and started working with 3-D CHARTS TO-GO, I wasn't sure what to expect. I'm a hard-core Lotus user, and frankly, I was intrigued by the prospect of creating THREE-DIMENSIONAL charts for use in my presentations, but c'mon, 3-D charts must be complex to produce...or so I thought. I began with a bar chart (my favorite). I entered my numbers in the Lotus-like cells on the 3-D CHARTS TO-GO screen and clicked on "bar chart." What happened next was amazing. Instantly, a precisely accurate chart drew itself in dazzling colors right before my eyes — in true 3-D! After my heart rate slowed back to normal, I called up an existing Lotus file to chart some sales figures. (I don't have to exit Excel to use 3-D CHARTS TO-GO.) Just a couple of clicks and I had a brilliant pie chart with each slice accurate to the penny and with wonderful dimensionality. I was floored! Three-dimensional charts allow me to see complex relationships easily, and I can communicate these relationships with far more impact than with 2-D charts. The third dimension is not just beautiful — it's powerful! And I can print my charts on any Windows-supported printer including HP LaserJets, PostScript language printers, color printers and more — over 150 in all — and I can easily import graphics into my charts to illustrate my ideas.

The 3-D CHARTS TO-GO box was probably the most exciting one I've opened since my copy of Windows 3.0 arrived.

– Carl Fiorentino, President, TigerSoftware.

Great for Slide Presentations!

Why settle for two-dimensional charts when you can create explosive 3-D charts in just seconds with 3-D CHARTS TO-GO? This easy-to-use system will produce 3-D Pie, Bar, Area, Text and Line charts instantly, using your existing Excel numbers through its advanced clipboard. The innovative "split-screen" feature allows you to see both the data and the chart together for fast editing — you don't have to flip-flop between two applications when you create charts. And 3-D CHARTS TO-GO will give you three different chart views: Perspective, Isometric and Oblique.

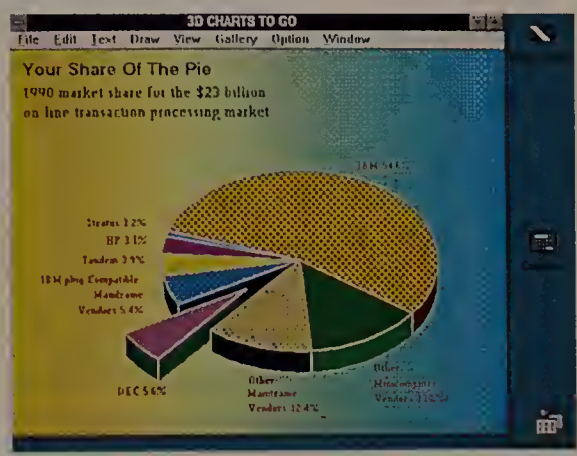
Control Size, Angle, Color, Type and Reproduction Quality.

3-D CHARTS TO-GO allows you to interactively control the size of your charts — so you see the adjustments as you make them! Sizing is as easy as clicking to get the exact size you need. Click again and adjust the viewing distance, click once more and change the rotation angle to add unique perspective to your chart. This rotation-angle control allows enormous flexibility in presenting your charts so that the data is clearly displayed. Quickly select from 17 different chart drawing patterns and 8 foreground and 8 background colors. Want to get crazy? Click to create a host of available special effects on the background and shadows to enhance the three-dimensional effect.

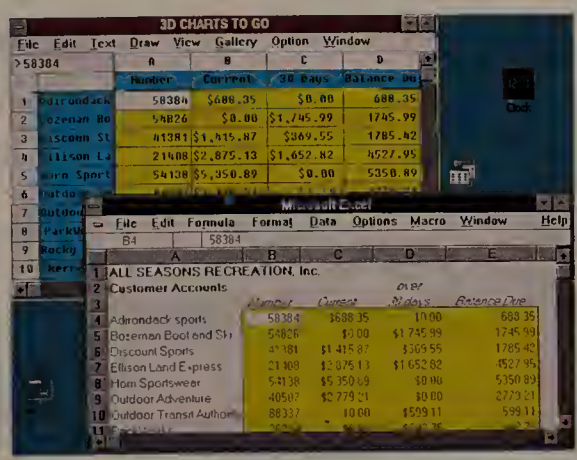
There's more, like the ability to select your choice of chart quality: Draft, Fine Black and White and Fine Color. And 3-D CHARTS TO-GO gives you creative freedom when adding type to your charts. Your chart's title, subtitle, descriptive lines, labels, legend and footnotes can all be individually sized, colored and employ different fonts.

Interface with Lotus, Excel, PageMaker and Others.

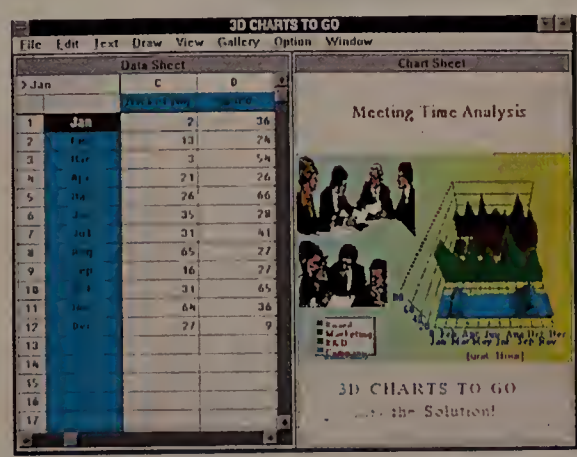
What makes 3-D CHARTS TO-GO even more impressive (and useful) is its ability to use data from Excel (and many other Windows-based applications). You'll quickly export numbers to 3-D CHARTS TO-GO without exiting Excel. You can easily merge up to 10 individual charts, print them together and perform fast, accurate data comparison. If you're a PageMaker user, you can enhance documents containing financial information and grids following the same simple steps. And since 3-D CHARTS TO-GO supports .WMF, .PCX and .BMP file import formats, you can add professionally prepared clip art images to your charts to make them even more visually striking. You can even create spectacular on-screen slide shows.



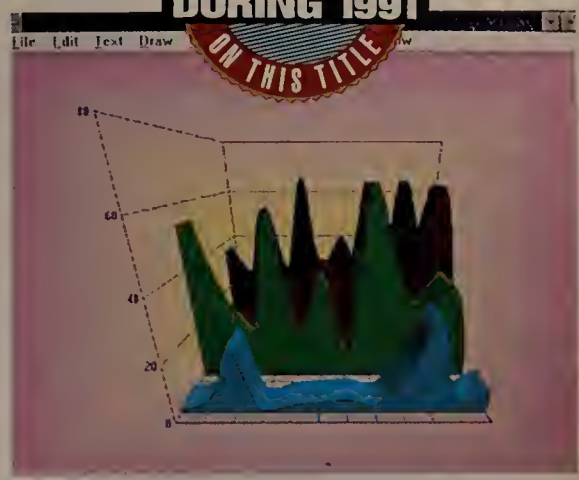
Fully featured for presentation graphics. Add text comments and labels, import graphics images, change background colors and effects, and much more!



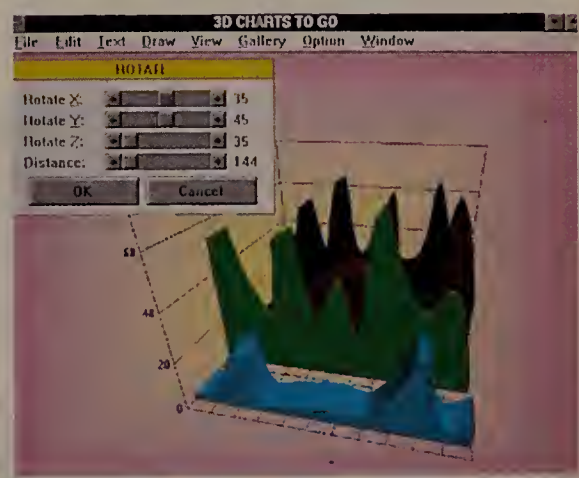
Getting data into 3-D CHARTS TO-GO is a snap. Simply cut and paste from Excel or any application where numbers are kept. Then instantly see your 3-D graph.



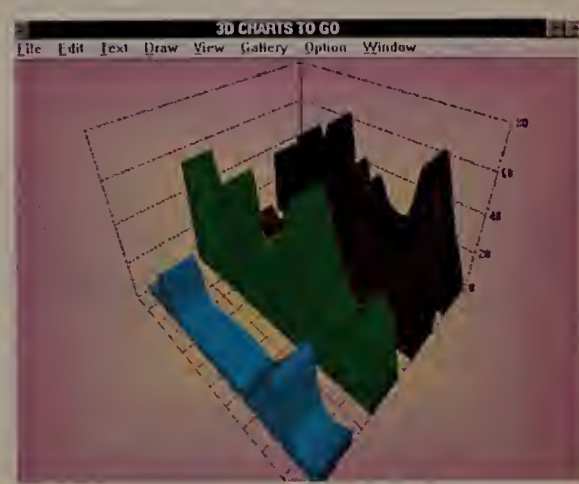
See your data, your chart, or both! Select only part of your data and instantly see the chart for only that selected data!



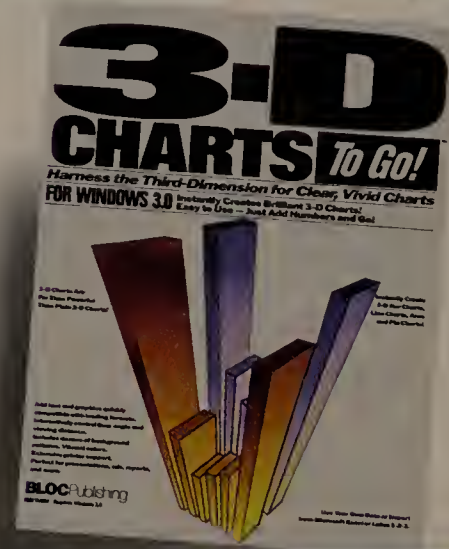
From any angle, you can quickly rotate your chart...



....to reveal the drama of your numbers...



...and create a chart with a more powerful impact...



3-D CHARTS TO-GO

UY 1399 3-D CHARTS TO-GO 5¼" & 3½" $99.95
Requires Windows 3.0 and 640K.

TIGERWINDOWS FREE FEDERAL EXPRESS TO ORDER 1-800-888-4437

Circle 259 on reader service card

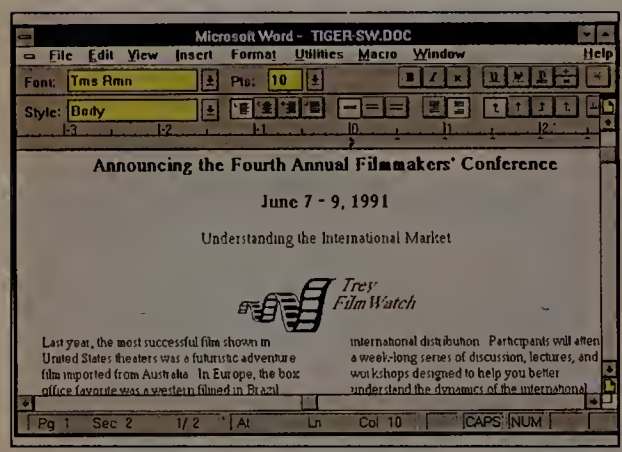
Word for Windows — The Graphic Advantage from Microsoft.

Tomorrow's Word Processor — Today.

If you're still using a character-based word processor, step up to the future. Word for Windows is a graphics-based word processor that is a work of art. Why write without knowing what the final page will look like? With Word for Windows, What You See Is What You Get, while you're working on it!

And why remember long lists of keystrokes when all you need to do is select a picture and the job is done? Word for Windows turns complicated functions into simple little symbols (called *icons*).

Word for Windows shows you exactly what will print on the page, mixing text, pictures, graphics, spreadsheets and charts. And when speed counts, use *Draft View* for lightning-fast work!



See It As It Will Print...

Because it takes full advantage of Windows, only Microsoft Word for Windows takes the hard work out of creating and managing your business documents, allowing you to work more efficiently.

Microsoft has for years been setting the highest standards in the computer industry. But their amazing ability and commitment to excellence lofts them above the competition with Word for Windows. This is where the others will try to reach in the years to come, but you can join the multitude of enthused users now!

Picture Perfect...

A picture is worth a thousand words, but in this case maybe a thousand keystrokes. The graphical nature of Word for Windows lets you more effectively and easily write and manage your documents.

- **Click An Icon.** Want to bold a sentence? Click — it's done. How about center a heading? Click — no problem. Icons make character and paragraph formatting quick and easy.
- **Mix Anything.** Text, pictures, graphics, spreadsheets, and charts — all mix in the same file. See the exact image of the printed page on the screen as you write.
- **5 Different Views.** Switch instantly among five different views of your document:
  Normal View — create and see your document with formatted text.
  Draft View — for the fastest typing when formatting isn't important.
  Outline View — for organizing and structuring your document.
  Page View — see all page elements in place for final editing before printing.
  Print Preview — see the position of text and graphics on the whole page at once.

Save Time — Keep It Standard...

Word for Windows gives you ways to standardize your documents. Make memos look one way, reports another way, and business correspondence yet another way. And save time because they're set up in advance — *once!*

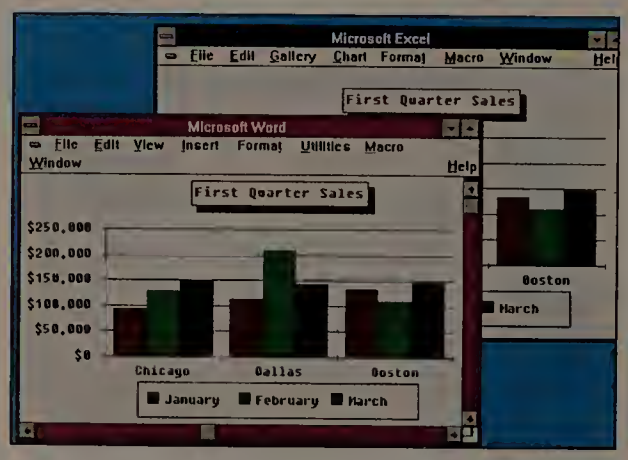
- **Paragraph Styles.** Capture the format of an existing paragraph to create paragraph *styles.* Then standardize formatting easily by selecting the predefined style you want.
- **Document Templates.** Templates give you a head-start in creating your documents. They automate formatting by giving you standardized models for your different type of documents — from memos to legal briefs to common business documents. Each template can change the menu selections, reassign keys, run special macros, and have formatted paragraph styles ready to go. This means consistent and fast documents.
- **Boiler Plate Text & Graphics.** Store reusable text and graphics in a special area, then insert them later to make writing really fast. Great for building contracts out of pre-written clauses!

"Highest rated word processor."
InfoWorld Report Card
January 7, 1991

"Analyst's Choice"
PC Week Product Review
December, 1990

Mix Text and Graphics — Easily!

The graphical nature of Word for Windows makes formatting and page layout quick and easy! Design professional-looking pages in minutes.



Word for Windows lets you easily share information with other Windows applications.

Share Information...

Word for Windows fits right in among your other applications.

- **Cut, Paste and Link.** With Windows applications, exchange text and graphics with Windows *Cut and Paste* feature. Even set up "links" between documents and other programs. For example, include data from a Microsoft Excel spreadsheet that updates your report with the latest changes made in Excel. Then print your report at any time with up to the minute information!
- **Import Virtually Anything.** Word for Windows has built-in conversions for WordPerfect, WordStar, and all the popular text, graphics and spreadsheet applications.
- **Merge.** Merge text to create form letters, address labels, phone lists, and other individualized documents.

Full of Features...

Word for Windows has all the features you've come to expect from a top-of-the-line application. But wait — there are features that, until now, were unthought of in any application! And these features flow with an ease and elegance that simplifies work.

- **Tables.** Word for Windows sets up elaborate tables without having to use tabs. Easily enter data, or perform calculations on columns of numbers.
- **Columns.** Create side-by-side paragraphs of text, or snake text from column to column automatically.
- **Text Flow.** Position text, pictures, and tables anywhere on a page and have the text flow around them.
- **Split Screen.** Split your screen and edit different parts of the same file, without scrolling through the document.
- **Document Security.** Lock a document so that reviewers can add comments, but protect the document from any changes — until you give the OK.
- **Spelling, Thesaurus and Dictionary.** Check spelling, find better words in the Roget's II Thesaurus, and hyphenate to polish your documents. And the thesaurus includes dictionary definitions so you'll communicate what you want.
- **Indexes, Contents.** Generate tables of contents, indexes, tables of figures, and similar lists of exhibits that appear anywhere in a document.
- **Find Files.** Find a particular document with the Word for Windows Retrieval feature. Search quickly by author, date, title, subject, key words, or any other text you want.
- **Customizing.** You can customize Word for Windows — change menu selections and keyboard assignments for each type of document you work on. Have a few, simple menu selections for memos, but full-blown capabilities and menus for special reports. Create prompts that ask if you want to insert text, graphics, files, and various other document contents.

Microsoft®

WORD FOR WINDOWS

UY 3420 **Word for Windows** 5¼" & 3½" **$359.95**

Running Word for Windows alone: IBM PC or compatible with 286 or higher processor; 640K memory; IBM EGA or higher resolution monitor compatible with Microsoft Windows.

TIGERWINDOWS FREE FEDERAL EXPRESS TO ORDER 1-800-888-4437

Circle 259 on reader service card

Make Windows Run 550% Faster!

The Results of Our FAST! vs. Windows Performance Tests...

You read the headline right — up to 550% faster! FAST! employs advanced speed enhancement techniques and brings them to a new, sophisticated level that delivers blazing speed to Windows — and any program you run. It's simple to use — just load it and go!

How It Is Possible?

FAST! incorporates the proven speed-enhancing performance of "disk caching" and adds an innovative twist — FAST! includes a form of "intuitive logic" that actually anticipates what data your CPU will be seeking, and reads that data from your fixed or floppy drive into a special RAM buffer (or "cache") — BEFORE the CPU asks for it!

As a result, your CPU spends virtually no time at all waiting for disk reads — an inherent logjam that slows processing time significantly.

And using FAST!, you'll notice that the more disk-intensive the application (database, for example), the more time FAST! will save — and the faster your applications will run.

And since FAST! reduces drive read time so dramatically, it also reduces wear on the disk drive — extending its life.

Doesn't Windows Have a Caching System?

Windows comes with its own disk caching software — SmartDrive — and it's good. But FAST! is over 5 times better!

Charles Bermant, author of The Windows 3.0 Comparison, wrote, "One solution (to the speed problem) is to replace Windows' disk cache, SMARTDRV.SYS, with another cache. One such program, FAST!, has made my recent Windows like a lot easier. FAST! makes everything appear faster."

On a standard Drive Evaluation Comparison test, FAST! increased performance over 1700% — and 550% over Windows' caching software!

Don't Buy More Equipment...

You could spend thousands of dollars trying to achieve the speed required for truly efficient computing. Items like high-speed drives, turbo boards — even complete system upgrades try to overcome your system's inherent slowdown — waiting for disk reads.

FAST! eliminates this processing tie-up and gives you top performance - for $99.95. And FAST! will work with conventional, extended or expanded RAM.

What FAST! Can Do for a 386...

FAST! will deliver spectacular results on your IBM PC, XT, AT and PS/2, but imagine how much faster the "new generation" of ultra-high speed processing technology like the Compaq 386 or Intel's Above Board will run using FAST! — they instantly leap into a new computing class!

"Hot-Key" Controls.

In addition, FAST! supports "hot key" controls for instant response and installation — saving even more time and allowing you to be more productive.

Overcome a Windows 3.0 flaw with the most powerful caching system available.

Our Performance Benchmark.

The technicians at TigerSoftware tested FAST! by matching it first against a plain set-up with no disk-caching software and then against Windows' SmartDrive. Using a hard disk manufacturer's standard Drive Evaluation Comparison, FAST! outperformed the plain set-up by 1700% and SmartDrive by 550%.

Close-Up: What Is "Disk-Caching"?

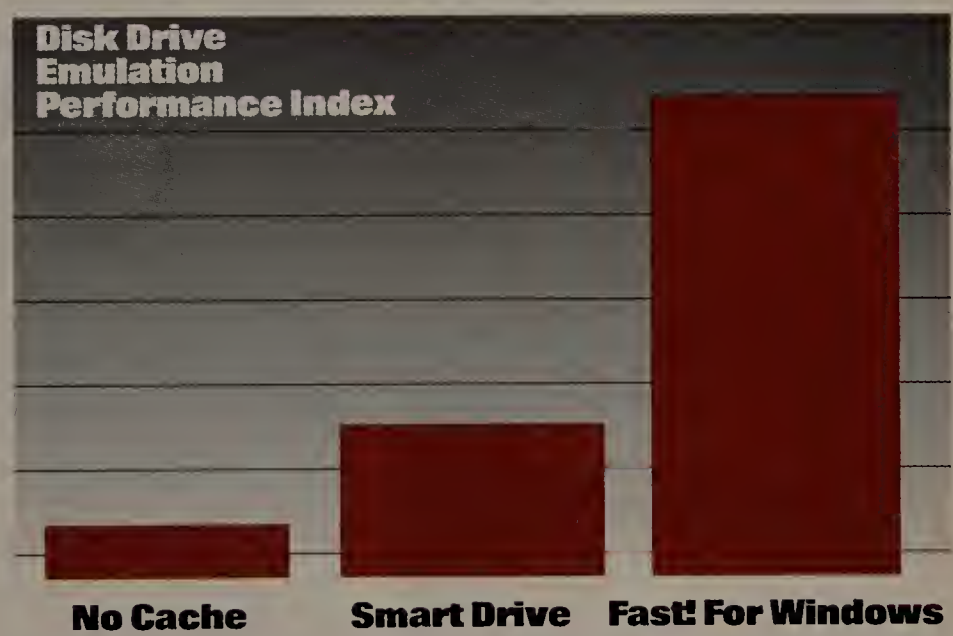
FAST! uses a RAM management technology called "intelligent caching" to eliminate downtime from the central processor's performance.

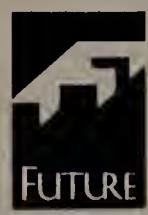
Improvements in processor technology have brought about CPUs with blazing speed' however, their real performance is limited to that of the slowest component in the system. Floppy and fixed disk drives, which have much lower data transfer rates than the central processor, are notorious for the drain they impose on the overall system performance.

FAST! works by "uploading" data into a RAM cache before the CPU calls for it. While this RAM management technique is not unique to FAST! (in fact, it's been employed by mainframe applications for years), the particular genius of FAST! is its ability to find and load significant file data rather than merely reading in sectors of data randomly. This "intelligence" is the key to why it offers performance vastly superior to other caching software products.

FAST! also represents a superior alternative to hardware upgrades like turbo boards, enhanced processors and high-speed drives, at a fraction of their cost. Given the virtually infinite combinations of hardware configurations and application programs, FAST! will provide different performance enhancement specific to each situation.

You'll be astonished by the improvements in your desktop publishing, word processing and graphics software performance. You'll find that any software runs faster with FAST!, even DOS. It also eliminates wait by saving files instantly to the RAM cache, downloading to disk only at opportune times, rather than holding up processing speed. And FAST! enhances even floppy-based systems, without hard drives. There's simply no better or more cost-effective way to enhance your system's speed.





FAST!

UY 3850 FAST! 5¼" $99.00
UY 3855 FAST! 3½" $99.00
IBM AT or compatible, Windows 3.0, 640K and a hard disk.

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The Word Processor That Lets You Get the Most out of Windows.

For Pages That Need Drama and Flair.

When you made the decision to run Windows 3.0, you experienced the wonder of the Graphical User Interface. The fact is, there's only one Windows-based word processor that truly exploits the beauty of this remarkable operating system. Ami Pro.

Ami Pro was designed for Windows 3.0 from the ground up. It combines all of the features you counted on in your character-based word processor and combines a complete set of tools found only in desktop publishing applications. More than word processing, more than desktop publishing, Ami Pro makes the best use of the powerful WYSIWYG environment and brings your documents to a new level of sophistication — and ironically, we found it much easier to use than Microsoft Word for Windows. Ami Pro's extremely intuitive nature makes it fast and fun to use. View your documents as you edit them, including all text, headers, footers and footnotes. Use Ami Pro's "frames" (which can contain text for page-within-page formats) to pick-up-and-place graphics easily and position them precisely within the page. You'll see it right on-screen as you work!

Why Run Windows 3.0 if You Don't Make Use of Its Power?

Whether you're an executive who types only occasionally, or a heavy user who demands a long list of specialized features, you'll achieve impressive results with Windows 3.0 and Ami Pro. Occasional users are out of the chute faster because Ami Pro is easier to learn and use. Heavy users enjoy features they can't find anywhere else, like tables that allow you to perform math, automatically create charts and graphs (easily import data for charts from spreadsheets with 12 styles to choose from), draw, employ its Dynamic Data Exchange capabilities with other Windows applications and even create documents using its powerful style sheets. You can't do this with any other word processor under Windows. Why not use all the power that you paid for when you bought Windows 3.0 in the first place?

Have You always Found Mixing Text and Graphics Difficult?

Who hasn't? But you'll actually have fun doing it with Ami Pro. Today, with most businesspeople drowning in paper, your documents need the snap that graphics provide. But you've always had to wrestle with different formats, complex import commands and then work for hours to position your images neatly within your text. Ami Pro takes a far more enlightened approach. It includes a set of style guides that you can use to quickly put together ads, multi-column newsletters, brochures, letters, reports, presentations and even your everyday correspondence. With Ami Pro's graphics handling features (and using its "frames" described above), inserting graphics is just a mouse-click away — in exact position, exactly the way you want them. No other word processor or desktop publisher under any platform makes it as easy for you to look good in print.

Word Processing Capabilities:

- ***Text attributes:*** font, alignment, spacing, normal, bold, italic, underline, word underline, upper case, lower case, initial caps, small caps, superscript, subscript, double underline, strikethrough, overstrike character and protected text.
- ***Editing functions:*** undo, cut, copy, paste, dates and bookmarks.
- ***Annotation:*** footnotes and non-printing notes.
- ***Paragraph control:*** font, alignment, spacing, page breaks, special effects (leader text, bullets, outline numbering), lines and hyphenation.
- ***Page formatting control (layout):*** margins, tabs, columns, page size & orientation, lines, headers & footers, page & line numbering, & page breaks.
- ***Frames:*** for both text and graphics.
- ***Document views:*** four pre-set view levels and one variable view level.
- ***Document modes:*** draft and layout.
- ***Document description:*** date created, date last revised, total revisions, imported files, description and revisable field names.
- ***Print control:*** all or selected pages, reverse order, collate, crop marks, preprinted forms and bin support options.

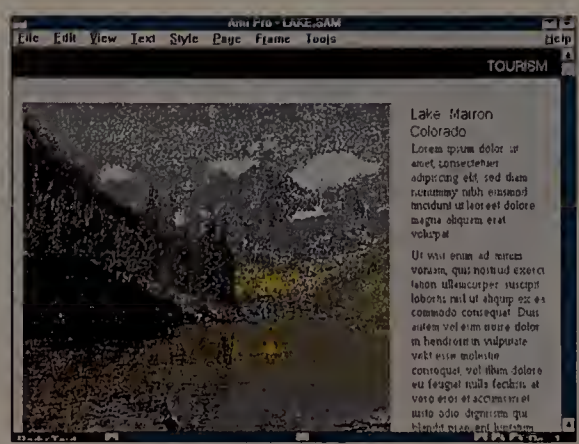
Tools:

- Automatic Index and Table of Contents Generator
- Find and Replace
- Glossary
- Go To
- Sort
- Spell Checker and Thesaurus

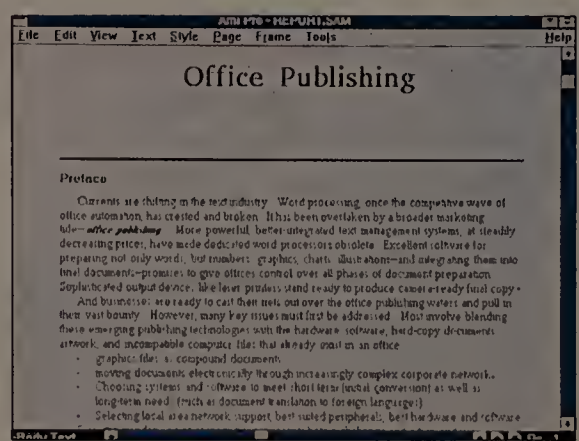
Additional Features:

- Charting and Drawing, Clip Art
- Dynamic Data Exchange (DDE) support
- File Management
- Graphics Integration
- Import/Export and Append capabilities
- Macros
- Merge
- Tables

In a quarter of the time you're currently spending on word processing, you can create documents that have desktop publishing written all over them.



Ami Pro not only gives you the features of conventional high-end word processors, it makes them so accessible, you may actually use them.



Add headers and footers to manuals and large reports. Ami Pro also quickly prepares Table of Contents pages.

Lotus

The Industry Applauds Ami Pro

PC Week Poll of Corporate Satisfaction
Ami Pro received a score of Ease of Use of the User Interface that was fully 10 points higher than the next highest score and came in 14 points ahead of the score WordPerfect 5.1 drew from its buyers.

PC Magazine Editor's Choice
Of all GUI word processors, Ami Pro has the widest variety of features and is perhaps the most enjoyable to use.

PC Computing MVP
A stunning achievement, one that no other PC word processing product — not even Microsoft's estimable Word for Windows — can claim to have reached.

PC World Best Buy
Ami Pro's easy to use formatting tools are hard to resist. If your documents typically include graphics, it's your Best Buy.

InfoWorld Excellent Value
Easily handles graphics mixed with text, imports a host of text and graphics formats effortlessly, and does other office chores such as mail merge with ease and power.

AMI PRO

UY 1640 **Ami Pro** 5¼" & 3½" **$375.00**
Requires Windows 3.0 and 640K.

TIGERWINDOWS FREE FEDERAL EXPRESS TO ORDER 1-800-888-4437

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Only the Premier Desktop Organizer for Windows Could Look This Good...

PC WORLD BEST BUY

Phone Book, Calendar, Programmable Dialer and Calculator.

One of the great strengths of the PC is its ability to help you to keep track of your busy career, the things you do, the people you deal with, and all the hundreds of details that you're responsible for. With the power and clarity of Windows, a desktop organizer has the ability to make it even easier to see exactly what's happening, when it's happening and where you are at all times. All you need is the right program! In short, the graphics are magnificent, logical and fast. The DeskTop Set is the ultimate Windows accessory, making efficient use of your entire Windows environment. It is integrated around an address book, calendar, phone dialer and tape calculator with pop-up expert menus that supplement the Windows menus. What's more, The DeskTop Set contains a set of printer support, page definition and font support features that leave the same features supplied with Windows in the dust.

The Integration Is The Secret...

Although the programs contained in The DeskTop Set are very useful individually, using them together expands your productivity and elevates your vision to a new level. For example, the Phone Book is actually a database, each entry of which is associated with a business and personal record.

The Phone Book...

Rich and powerful, the Phone Book will accept any number of entries and allow you to enter them individually or by topics. It also supports Yellow Pages, so you can create your own specific directories of commercial and personal numbers. You can perform instant searches phonetically or by category, import/export information, print labels, envelopes, reminders, Rolodex® cards and Day-Timer® pages — or create your own designs in just seconds!

The Calendar...

Switch instantly from daily, monthly and annual modes — enter events without ever touching your keyboard! Create unlimited "to-do" lists and then quickly consolidate them into a daily prioritized list. Link events and "to-do" items to files and documents on hard disk and to people in the phone book. You can attach reminders or special notes to every event and "to-do" item. And when you are away from your PC, take along beautiful printouts in "to-do," itinerary or monthly poster formats.

Memory Dialer...

Fast and convenient, The Phone Dialer offers a detailed phone log, area-code directory, least-cost routing system, credit card call manager, support for touch tone services, custom dialing formats and extensive set-up options — all so simple to use that your phone will become the powerful, productive instrument that it was meant to be.

Printing Calculator

What desktop set would be complete without a handy calculator? This one scrolls back and revises transactions, prints, saves, recalls, copies and pastes tapes. You can also annotate each entry in plain English.

What the Press is Saying About The DeskTop Set for Windows 3.0

"The Phone Book module in Okna's DeskTop Set may be the most complete Rolodex-Dialer combo ever." — **PC World, November 1990**

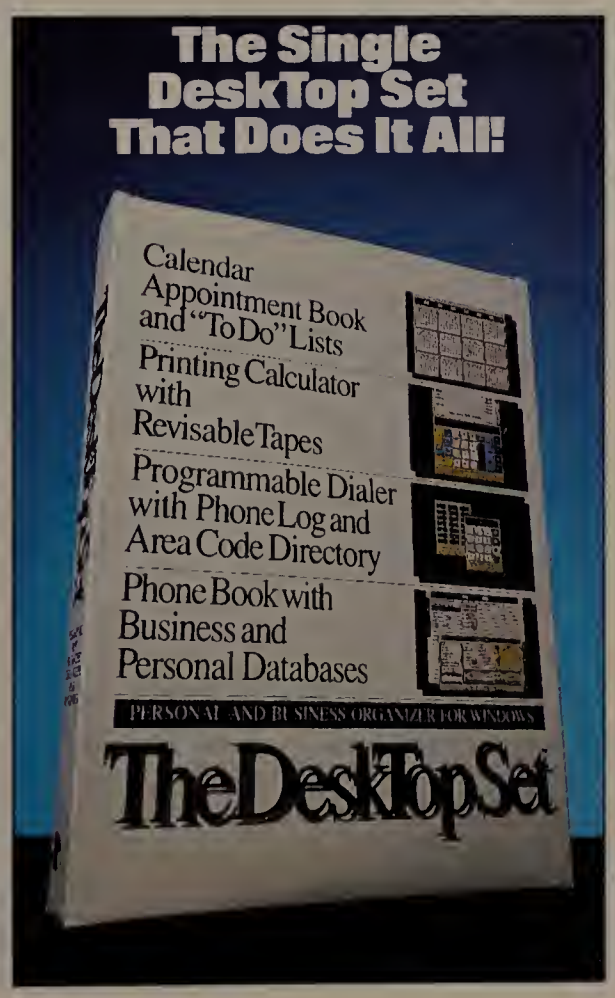
"(The DeskTop Set) admirably replaces Windows' wan collection of desktop utilities... The phone book... is superb... the calendar is also head and shoulders above Windows' (calendar)... the on-screen (calculator) tape may be worth the price tag — especially when a tape can be annotated, globally edited, and saved for later reference." — **Patrick Marshall, PC World November 1989**

"...The DeskTop Set could be a bargain, even if all you use is the Calendar and the Phone Book." — **Michael J. Miller, InfoWorld July 24, 1989**

"Attractive, feature-packed desk accessories- ...(The DeskTop Set's) integrated address book, calendar, and dialer accessories make a first-rate addition to any Windows desktop." — **PC Magazine, January 30, 1990**

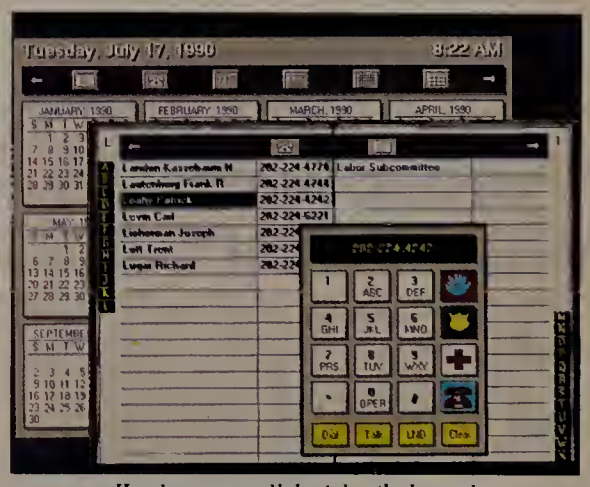
"(DeskTop Set is) the easiest PIM on the block to learn, yet the attractive phone book, dialer and calendar are far more complete than (IBM's) Current's. If you need a no-muss, no-fuss personal productivity tool, DeskTop Set is your Best Buy." — **Patrick Marshall, PC World February 1991**

"If you use Windows and you use the telephone, get yourself a copy of The DeskTop Set." — **Martin Heller, Computer Shopper July 1990**



Keep organized with the Calendar's features — integrated with the Phone Book!

A desktop organizer like no other... fast, powerful — unlimited capacity!



Handy memory dialer takes the legwork out of phone work.

...And so much more! The DeskTop Set looks great, functions fast and makes you more productive!

THE DESKTOP SET

UY 1390 **The DeskTop Set** 5¼" & 3½" **$99.95**

Requires Microsoft Windows 3.0 installed; hard disk with at least 1.2 MB; mouse or compatible pointing device. Supports Hercules, EGA, VGA, Super VGA and 8514A. Not compatible with CGA. Hayes-compatible modem (optional).

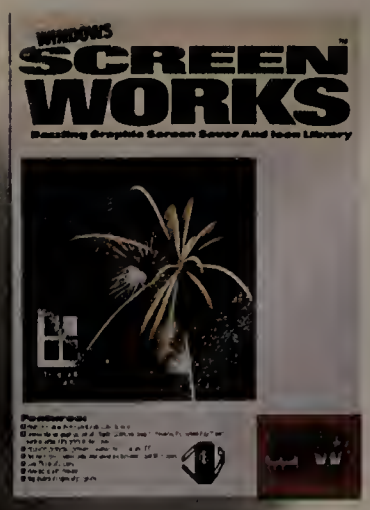
TIGERWINDOWS FREE FEDERAL EXPRESS TO ORDER 1-800-888-4437

Circle 259 on reader service card

Save Your Screen From Deadly "Burn-In."

Also Includes a Library of over 80 Professionally Designed Icons!

TIGER EXCLUSIVE — FREE UPGRADES DURING 1991 — ON THIS TITLE



Screen Works is a true value in Windows 3.0 software, packing a dazzling screen saver along with a library of clever icons for use in customizing your screen. Without a screen blanking system, which automatically activates when your computer is left idle for a certain period of time, you're running the risk of damaging phosphor burn-in. Your monitor will display your choice of screen movement: captivating fractal geometric designs; a spectacular fireworks show; a "bouncing icon" (also display the time of day if you like), or complete blackness. Just hit any key when you return to your desk and the screen is instantly restored.

Also Includes Password Protection.

Screen Works is the only screen saving system that offers you complete password protection as an added bonus. If you step away from your desk or out of the office for a moment, Screen Works prevents access to your work. This is an important feature for businesses converting to the Windows environment and worth the $29.95 pricetag alone.

Screen Works also Includes a Complete Icon Library!

Windows 3.0 is a wonderful environment, but the icons provided leave something to be desired. Screen Works gives you a library of over 80 icons that you can use to quickly customize the look of your screen. There's an icon for virtually any type of Windows program, and many DOS programs as well.

Protect Your Monitor from Phosphor Burnout:

- Eye-pleasing colorful geometric graphics twist and turn infinitely.
- Entertaining 4th of July fireworks.
- Use the simple icon, or icon with digital clock.
- Avoid distraction by blanking the screen completely.
- Change blanker displays anytime.
- Customize screen blanking interval, up to 99 minutes.

And, as a bonus, you get the ScreenWorks™ icon library. Over 80 custom icon designs let you change the meager collection of icons Microsoft provided for your DOS applications with colorful, intuitive icons:

Give the Windows™ 3.0 Environment a Personal Touch:

- For popular DOS programs — word processors, spreadsheets, etc.
- For games — icons of football, baseball, golf and more.
- For networks: drive selection icons from A: to J:.
- Icons for tutorials and other personal productivity programs.
- Over 75 colorful icons.
- View icons with Preview.
- Represents all types of programs.
- Replace the dull DOS icons Windows 3.0 provided.

Softsync/BLOC

SCREENWORKS

UY 2110 **Screen Works** 5¼" & 3½" **$29.95**
Microsoft Windows 3.0 environment for IBM AT and Windows compatible printer.

The Advanced Windows Backup System. More Power, More Precision Tools — and Easier to Use!

The Ultimate Backup for the Windows Environment...

Distinct Back-Up is really two products in one. Its brilliant user interface makes it simple and intuitive — it is a handsome windows application. Distinct Back-Up contains an enlightened set of tools and features to help you backup, restore and protect your data with precision and efficiency — it is a new concept in backup technology.

If you've ever suffered the painful blow of a computer virus, or the sobering shock of an untimely hardware failure, you understand the importance of regular backups. Distinct Back-Up provides you with the latest backup technology. It is fast, reliable, powerful and feature packed.

Unlimited Flexibility and Compatibility...

Any DOS device — hard drives, floppy drives, Bernoulli boxes, network drives — if it has a drive letter, Distinct Back-Up will take care of it. Distinct Back-Up allows the simultaneous use of multiple trees for fast easy movement, and has a file viewer to simplify the backup of selected files. Backups are saved by project together with their screen layout and options, simplifying all subsequent backups. Distinct Back-Up offers five backup methods and several backup criteria. These include data compression to save space, verify after writing providing bit-by-bit verification of all data backed up, password encryption to prevent unauthorized access and many more. Supported servers include Novell, Lan Manager, DecNet, Banyan and NFS.

The Reliable Back-up Engineered for Windows 3.0...

...That has dozens of features to help you protect your priceless data, faster, easier and more securely. Each backup project may be saved with all its settings and for added convenience may be scheduled to run automatically onto your network server. Back-Up will run in the background while you carry on with your other tasks. A screen blanker with password protection provides screen protection and security when running unattended backups.

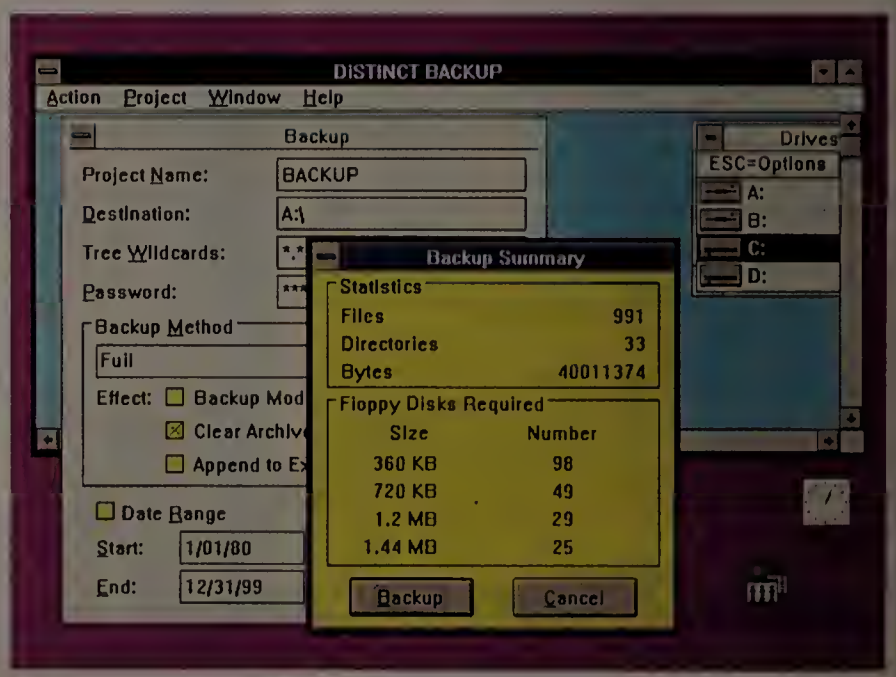
Just Set It and Forget It!

Distinct Back-Up doesn't require a lot of "hand holding." Just set your backup project and Back-Up takes care of the rest. It provides you with a visual layout of the backup project contents and restores selected files without the time-consuming scanning of several disks.

DISTINCT BACK-UP

UY 1350 **Distinct Back-Up** 5¼" & 3½" **$99.95**
IBM AT or compatible, Windows 3.0, 640K and a hard disk.

distinct



Just select and click! The fastest, easiest way to back-up with Windows.

TIGERWINDOWS FREE FEDERAL EXPRESS TO ORDER 1-800-888-4437

Circle 259 on reader service card

Powerfully Connect Pictures and Data...

It's a Database, It's a Graphics Program, No — It's THINX!

You were born using the most powerful image based computer in the world — the human mind. With your computer, you're able to link image with data to make a decision.

But it's not always that simple because each of us has different "software." Some of us are number crunchers. Some of us work best with facts. Others with images. That's why we work in spreadsheets. Or graphics. Or databases. Now, Thinx personal computer software links the spheres of knowledge for you.

Thinx Software is an intelligent graphics program that works in the Microsoft Windows environment. You literally draw your own conclusions.

Change your data and Thinx changes your drawing or plan. Change your drawing or plan and Thinx changes your data. Turn sales figures into a highlighted map. Delete a desk from a floor plan and Thinx software automatically recalculates total cost.

Thinx to Existing Data...

Thinx software works directly with spreadsheets like Microsoft Excel or Lotus 1-2-3, databases like dBase and graphics and design programs like Micrografx Designer. But you don't need *any* software to use Thinx. Thinx software already includes its own spreadsheet, database and graphics tools. So use material from other programs or work directly in Thinx.

No matter how you put the elements in, Thinx software takes what you have — data, figures or images — and links them.

Really See the What-If's...

With Thinx, it's really easy to see what the effect of adding or subtracting a part of the whole is. One person used Thinx to create a LAN-design application. He now designs networks and easily sees the result as he changes different parts.

Thinx software offers number crunchers a better and faster way to analyze current data and explore "what-if situations."

Thinx offers database users a valuable method for analyzing data and for presenting it graphically in an attractive, understandable format. Thinx offers designers, planners and estimators a powerful productivity tool that lets them perform two functions — planning and figuring costs — at the same time.

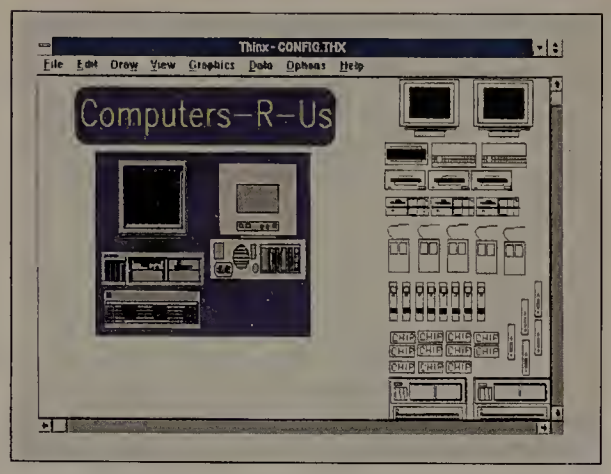
With Thinx software, you see what's what, what's where and what's best — instantly and understandably. And for the first time ever, you get the sum of *all* the parts — data and images — that equals a whole new way of working.

And now — with all the barriers removed — you can watch what happens as you make changes and test ideas. You can draw. Calculate. Analyze. And create. Just like the genius you were born to be.

Thinx Exchanges...

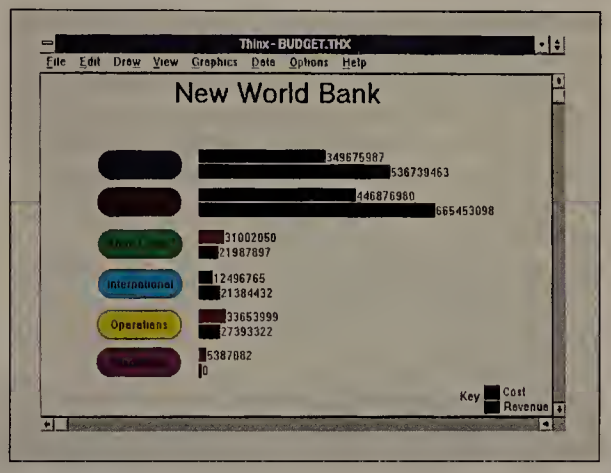
The Windows philosophy is that information exchanges should be intuitive. Thinx uses Windows facilities as well as more traditional data file links.

- **Windows Clipboard.** Cut and paste, Micrografx Draw Plus, Excel, bitmaps, and text.
- **Windows DDE.** Dynamic Data Exchange enables Thinx to take advantage of the full features, memory, and flexibility of Excel — and all other programs that run under Windows. DDE, a unique feature of Windows, allows Thinx to share data with other programs as they are running.
- **Direct File Import/Export.** dBASE, Lotus 123, Excel, and Micrografx Draw.



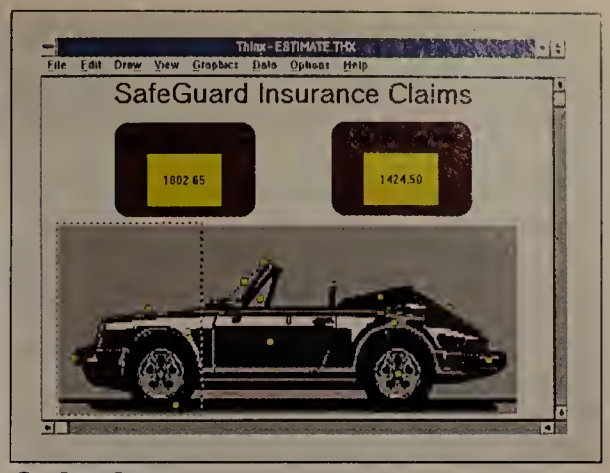
Draw...

Design the perfect computer system. Use the included graphics tools to draw the parts you need. As you define the components — monitors, mice, disk drives — Thinx links them to spreadsheet and database information. Change the components and instantly see the total cost, retail price, backorder status, whatever you need.



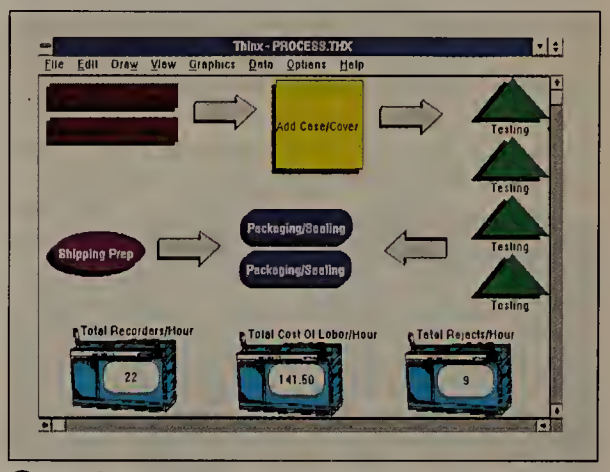
Analyze...

Don't be stuck with only bar, pie and line charts. View your data with a fresh, new look. There are hundreds of different ways to really *show* your data. And Thinx works directly with spreadsheets like Microsoft Excel or Lotus 1-2-3, or databases like dBase.



Calculate...

Did you cover everything? With Thinx, you see exactly what you have to work with and don't miss a thing. Thinx links images and data. Change the image on the screen and the figures are instantly updated automatically. This insurance company uses Thinx to estimate automobile repair costs. By simply clicking on the damaged parts, the repair bill is instantly available.



Create...

Watch what happens as you change parts of your operation and test new ideas. The ultimate procedure diagram, Thinx shows the bottom line costs and output production as you mix and match labor and materials. What would happen if I added another guy in Shipping? Can I afford to transfer someone out of Testing? Thinx helps you create whole new solutions. Literally draw your own conclusions!

THINX

UY 1430 **Thinx** 5¼ & 3½ **$495.00**
IBM AT or compatible, Windows 3.0, 640K and a hard disk.

Bell Atlantic

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Circle 259 on reader service card

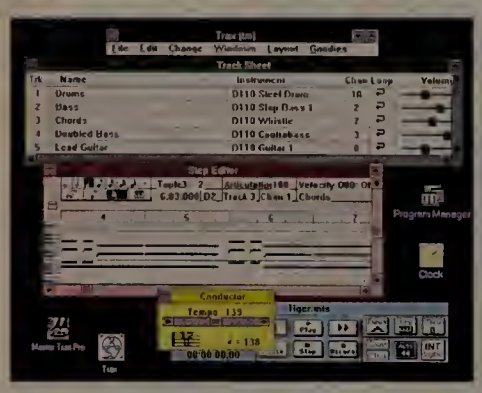
Put a Recording Studio on Your Desktop!

Pro Sound for Multimedia Presentations and Home Entertainment.

Professional sound and music has come to the PC! Do you want your desktop presentations to have the emotional impact of incredible sound and music? Are you a professional musician looking for a way to create a chart-busting hit with enormous ease and power? Are you a computer buff with a hidden craving to create rapturous music? Passport, the largest music software company in the world, has the key to your success!

What's MIDI? MIDI, the Musical Instrument Digital Interface, is a simple, sophisticated way to connect your PC to an unlimited number of musical instruments, synthesizers, audio and visual gear. This technology can put the power of an electronic orchestra right on your desktop. With the MIDI connection, you can play on a synthesized keyboard and watch the notes appear on your PC screen — then edit them, or write a new song on your PC, then play it back through your synthesizer. Sync your music and sounds to visual gear for phenomenal multi-media presentations. Record up to 64 separate tracks of music and play them all back at once!

Trax. Passport Trax is a complete recording studio on your PC. A true Windows application, you'll compose, edit and playback multi-track recordings of any music imaginable. Trax gets you started in the world of MIDI in a clear and organized way. Trax is as easy to operate as a tape recorder but offers so much more. Onscreen play, record, fast forward and rewind controls move you through the song. Onscreen graphics display song, track and note information. View the song and see the different parts as they play. Zoom in and out to edit. If you ever wanted to add music to multi-media presentations, record songs or be a music producer, now is your chance.



Master Tracks Pro. For the professional musician who demands the very best in recording studio software — here's the award-winning program voted most innovative MIDI software product of the year. As easy as Windows — beautiful as Trax but infused with more powerful capabilities, Master Tracks Pro has become the new standard in the music industry. As world-class keyboard player Tom Coster says, "I used Master Tracks Pro extensively on my latest record. We literally did all the pre-production using Master Tracks Pro. Not only did we sequence all of the keyboard parts, but also the drums, horns, bass and rhythm guitar tracks. As a composer I couldn't have found a more perfect tool."

MIDI Hits. What? You're not a composer? You don't know how to write a song for your desktop presentation? No problem! You can buy your favorite song on a disk! You can edit or cut & paste your favorite song just the way you want it. Take out the drums, slip in some fanfare trumpets, add some building volume for a blasting finale. A powerful tool for multi-media presentations and musicians of all levels!

What Do I Need? First, you need the software — Trax or Master Tracks Pro. Then you need a card in your PC to connect your computer to your instrument or speaker system.

Available MIDI Hits Include:
In The Mood, Glenn Miller • *Peggy Sue,* Buddy Holly • *Blue Suede Shoes,* Elvis Presley • *Careless Whisper,* Wham • *Let's Go,* Cars • Mozart • *Peg,* Steely Dan • *Do It Again,* Steely Dan • *Born To Be Wild,* Steppenwolf • *What'd I Say,* Ray Charles • *Already Gone,* Eagles • *Wind Beneath My Wings,* Bette Midler

PASSPORT.

PASSPORT

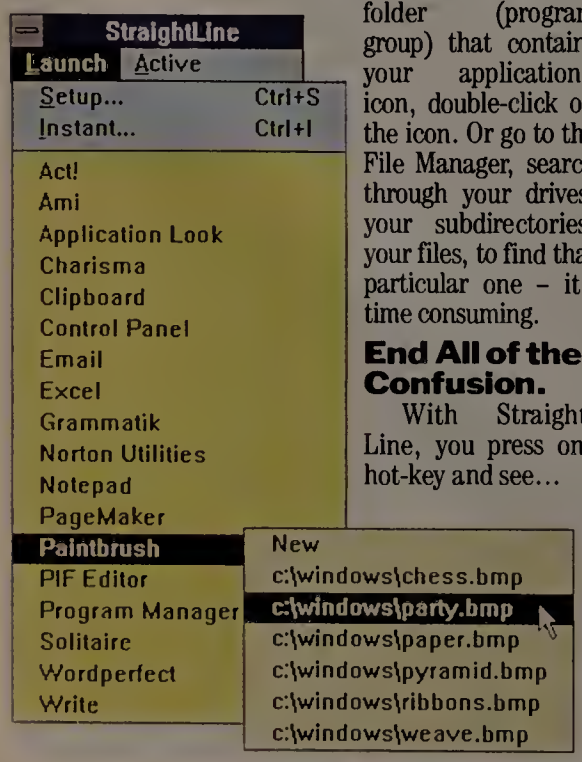
UY 2310 **Master Tracks Pro** 5¼" & 3½" **$299.00**
UY 2315 **Trax** 5¼" & 3½" **$99.95**
UY 2320 **MIDI Hits** 5¼" & 3½" **$29.95**
For more about MIDI Hits, call us! Hundreds available. 3 hits on a disk for $29.95!

Start Your Windows Applications 80% Faster!

StraightLine Is the Shortest Distance between Two Applications.

StraightLine is the easiest and fastest way to launch or change applications. With a few mouse clicks, you're running the application of your choice. StraightLine is powerfully simple, and an easy-to-use productivity tool that saves you 80% over standard application start times.

Windows is great, but sometimes switching applications can be time consuming. Minimize the application you're in, go back to the Program Manager, open the folder (program group) that contains your application's icon, double-click on the icon. Or go to the File Manager, search through your drives, your subdirectories, your files, to find that particular one – it's time consuming.



Just like a DOS menu, but for Windows.

End All of the Confusion.
With StraightLine, you press one hot-key and see...

Simplicity Is the Key...

StraightLine is so simple, most of our users don't need or read the User Manual. It all makes perfect sense. StraightLine is the shortest distance between two applications — allowing no complexities to slow you down. The power of StraightLine lies in its simplicity, speed and ease of use.

StraightLine will become second-nature to you. You'll actually use it more than all your other applications combined, so you know you're getting your money's worth. No more searching through work sets and groups of documents. No more rummaging through directories and file lists. StraightLine accesses installed applications and documents with a single menu choice.

With StraightLine, you'll easily navigate between active applications, determine where applications originated, and minimize or close any application, all with a single menu selection.

StraightLine Features:

- Save 80% over standard launch times.
- Launch new applications with a single menu choice.
- Launch a specific document attached to an application.
- Select active applications with a single menu choice.
- Switch instantly between active applications.
- Close all active applications with a single menu choice.
- Restore all active applications with a single menu choice.
- And much more...

PC Computing Says:
"This utility makes switching between programs and launching new ones almost effortless."

First Genesis Software, Inc.

STRAIGHTLINE

UY 1395 **Straightline** 5¼" & 3½" **$99.00**
Requires Windows 3.0 and 640K.

TIGERWINDOWS FREE FEDERAL EXPRESS TO ORDER 1-800-888-4437

Circle 259 on reader service card

Powerful Windows Performance, Amazingly Modest Pricetags.

Picture-Perfect Screens, Lightning-Fast Memory, Extra Serial & Parallel Ports.

Windows demands three things in order to deliver its full, masterful potential: extra memory to make running and switching between applications fast (or even possible), a mouse for "point & click" operation, and a video system to display those spectacular colors and graphics. Boca Research, a true leader in the microcomputer industry, comes through with a full range of solutions at prices you can afford.

Vibrant & Sharp MegaColors

Your standard VGA has 16 colors and things look OK. But with the SuperVGA and 256 colors out of a possible 262,144 your screen jumps to life! You'll see images in photographic quality that'll make you reach out and try to touch 'em. And with a monitor that displays 1024 x 768 pixels, you'll fit twice as many windows on your screen as before, with picture-perfect quality that'll make your friends drool. Run humongous 1024 x 768 displays for Windows, Ventura Publisher, GEM, WordPerfect, AutoCAD and more. Plus with your non-Windows programs like Lotus 1-2-3, Symphony, WordPerfect, WordStar and others, you'll see more by expanding your 80-column screen to 132 seemingly-endless columns. (It's a whole new way to analyze spreadsheets.)

More and Faster Programs

Feed Windows extra memory and watch it grow to full maturity. Switch from Excel to Word in the flick of a finger — then to Paintbrush without losing a beat, and without closing any applications! Windows runs everything faster, runs more applications at the same time, and runs rings around anything you've seen on your computer. And Windows isn't all that benefits from this memory; if your non-Windows program needs Expanded Memory — the BOCA boards deliver it. In a recent review of seven leading memory boards

by *PC Week*, the BOCA board beat the competition, scoring higher than all the others.

Port Ability

Ports, those things you never have when you need to plug in that new mouse or second printer, are few and far between. Your computer came with one or two, but to plug in a new mouse (which is an absolute must for Windows) you simply need more ports. BOCA gives you port ability with their high-quality yet low-cost IO (Input/Output) boards.

The BOCA Boards

- ***SuperVGA with 512KB.*** Supports Hercules, CGA, EGA, VGA, 640 x 480 in 256 colors, 800 x 600 in 256 colors, and 1024 x 768 in 16 colors. Designed for the 286, 386, and PS/2 Models 25 and 30, the 16-bit design is 50% faster than 8-bit boards. VESA compliant for full future compatibility. Requires a VGA or multi-frequency monitor.
- ***SuperVGA with 1MB.*** All the above plus 1024 x 768 in 256 colors in either interlaced or non-interlaced modes.
- ***BOCARAM AT/Plus with 0MB.*** Expandable to 8MB per board. Supports conventional, EEMS expanded, or LIM/EMS 4.0 expanded memory. For DOS, Unix, Xenix or OS/2 computers, running up to 33 MHz.
- ***BOCARAM AT/Plus with 2MB.*** All the above with 2MB of memory installed.
- ***BOCARAM AT/Plus with 4MB.*** All the above with 4MB of memory installed.
- ***BOCARAM AT/Plus with 8MB.*** All the above with 8MB of memory installed.
- ***IO/AT with 2 Serial & 1 Parallel.*** Two 9-pin serial ports and one 25-pin parallel port. Includes a clock/calendar for PCs and XTs. Fits in any 8-bit slot (PCs and XTs) or 16-bit slot (ATs and 386s).
- ***IO/AT with 2 Serial & 2 Parallel.*** All the above plus an additional 25-pin parallel slot.

BOCA RESEARCH INC

BOCA BOARDS

UY 2021	BOCARAM AT/Plus w/0MB	$130.00
UY 2024	BOCARAM AT/Plus w/2MB	$280.00
UY 2026	BOCARAM AT/Plus w/4MB	$395.00
UY 2028	BOCARAM AT/Plus w/8MB	$675.00
UY 2030	Super VGA w/512 Kb	$135.00
UY 2032	Super VGA w/1 MB	$165.00
UY 2034	IO/AT w/2 Serial & 1 Parallel	$62.00
UY 2035	IO/AT w/2 Serial & 2 Parallel	$68.00

If You Work with Images, DoDOT Is a MUST!

Professional-Strength Image Utility — Starts Where Paint Programs Leave Off.

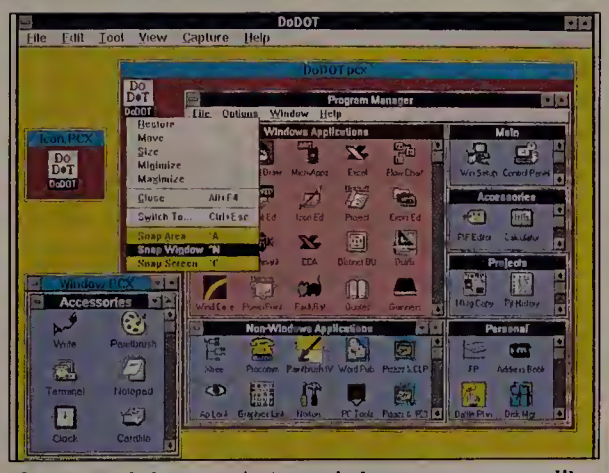
I work with images and screen captures all day long, and DoDOT is one of my vital tools. I do the graphic images here at TigerSoftware. DoDOT is the only application I've found that can capture a Windows screen with all 256 colors. Every screen you see in TigerWindows was done with DoDOT. DoDOT gives me the file conversions I need to handle anyone's image, no matter what format it's in. This is a professional-strength image utility. One I couldn't do without.

Have Image — Will Travel.

Images are great. From realistic images of the Golden Gate Bridge spanning the bay, to computer-generated star ships zipping at the speed of light, images capture emotions and communicate what can't be put into words. But coming back down to Earth, images come in a confusing array of incompatible formats. If you work with images like me, you know the barrier you hit when you hear, "Sorry, but I can only take TIFF files." Or how about getting images from a Mac to your DOS machine? This is when I load DoDOT. DoDOT can open, convert, and save in a multitude of valuable formats. For the Mac, the PC, in or out of Windows, I count on DoDOT.

See It? Like It? Capture It!

You gotta love Windows for all its wonderful graphics. It's fun to work in Windows, and it's even more fun when you can capture what you see on the screen to use in your paint program, your word processor, or just to print then and there. DoDOT will capture the entire screen, any window, or a specific area you define — and then save it in your favorite format. Capture multiple screens, windows and areas, then display them all at one time in DoDOT. You'll cut & paste, mix & match and rearrange your images to suit your special needs.



Capture a whole screen, just one window, or any area you like. Work with your images all at the same time, then save and use them in PageMaker, Ventura, WordPerfect, or a Mac!

For the professional, there are tons of vital tools like color separation to extract the four fundamental colors, dithering to convert color images to black & white, palette editing to change the color you see to the color you want, and many more.

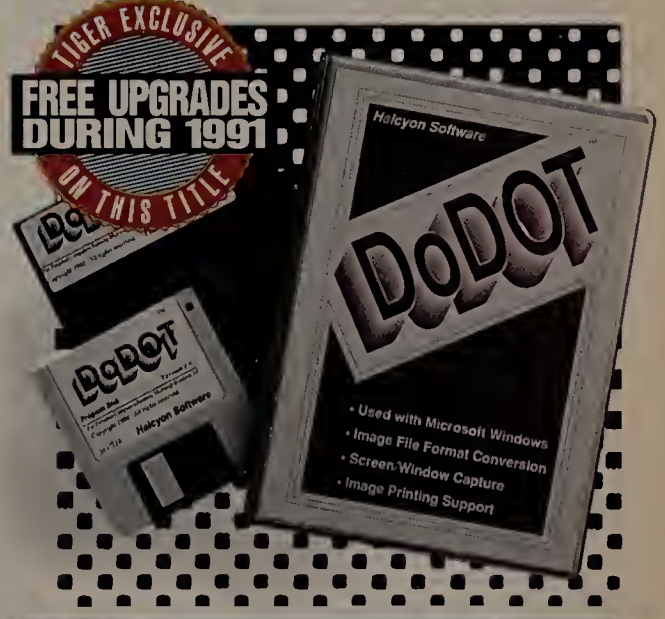
DoDOT Does Dots.

Images are basically dots on your screen. DoDOT takes total control of your dots and puts them at your disposal. Convert color images to shades of grey, or convert to different patterns of black & white for printing (this is called dithering). Invert from Black/White to White/Black. Separate colors so a local print shop can print color images in your publication. If you deal in dots like me, you've seen the problems. They can drive you dotty. (Is that where that word comes from?) DoDOT is your image solution.

DoDOT Does:

- PCX — PaintBrush
- TIF — Scanners & PageMaker
- GIF — CompuServe
- BMP — Windows & OS/2
- PIC — IBM Storyboard
- MSP — MS-Paint
- WPG — WordPerfect
- MAC — MacPaint
- PNT — FullPaint
- IMG — GEM and Ventura Publisher
- GX2 — Show Partner
- RLE — CompuServe
- PIC — Dr. Halo
- EPS — PostScript
- FAX — Facsimile
- ...and many more.

Halcyon Software



DODOT

UY 1410 **DoDOT** 5¼" & 3½" **$149.00**
Requires Windows 3.0 and 640K.

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The First 800 DPI Scanning System...
Includes Over $1100 in FREE Software.

Unmatched Resolution, 64 Levels of Gray, Scans to 640,000 Dots per Square Inch!

There is no other system available that can scan images, text, logos, photos, illustrations and designs with more precision than the Marstek M800 scanner and the incredible battery of image processing and OCR software in this exclusive TigerSoftware bundle!

The Marstek M800 scanner's unmatched technology delivers the crispest, cleanest images from any original. This is a professional scanning and imaging package, unlike anything else available today, allowing you to capture anything on your screen by simply passing the scanner over it! And its OCR (optical character recognition) software allows you to scan text from anywhere. Just pass the scanner over it and use it in any application — without re-keying.

The Marstek M800 also includes: Image-In Scan & Paint, Image-In Plus, Image-In Read and Image-In Vert (an $1100 value), for fine tuning your scanned images as well as providing a toolbox of sophisticated image manipulation features. Perfect for desktop publishing applications, as well as the new breed of Windows word processors, the Marstek M800 is extremely flexible, featuring advanced "yellow/green" scanning lights to capture the finest details — even from originals the size of a postage stamp! And the M800's special Inverse Scanning capability creates a wide variety of special effects.

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While 800 DPI technology will make your images scream, it's the software Tiger has assembled to accompany this technological marvel that makes this offer irresistable! Over $1100 in free software to crop, flop, invert, alter, enhance, posterize, retouch, digitize, resize, smooth and pattern-fill images — and to read, translate and convert text from any printed page for use in your documents. This image reading/processing software is used in higher-end imaging and publishing systems. And because it's so simple, anyone can produce the highest quality, professional results with very little effort. Everything you need is included — the scanner, interface kit, Image-In software utility disk and comprehensive user's guide.

100 Dots Per Inch

400 Dots Per Inch

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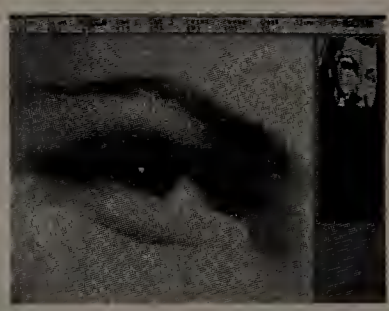

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For Mars Model 105 Plus and 800 Hand Scanners.

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Marstek

MARSTEK

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UY 1875 M800 w/Image-In ONLY	$299.00
UY 1890 M105 (400 dpi) w/Image-In & Perceive	$329.00
UY 1885 M105 With Image-In ONLY	$229.00
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The Creative System for Enhancing Scanned Images!

The Ultimate Enhancement System for Windows 3.0.

Now you can go crazy with logos, photos, line art and halftones! Here's the toolbox of highly advanced, simple-to-use software products for Windows that allows you complete control over your scanned images — including painting, gray scale image processing, OCR (Optical Character Recognition) and RTV (Raster To Vector) conversions.

Because these programs work together (also available separately), you can perform any task from one easy command console, eliminating the need to buy several expensive programs and perform tasks separately (i.e. PC Paintbrush, OmniPage, Streamline and Picture Publisher). Image-In is a must system for anyone who creates newsletters, ads, illustrated documents, prints them on high-resolution output devices and wants the absolute best possible quality and complete control. Now your PC can produce the same professional results that were once only the products of high-end dedicated workstations.

Image-In Scan And Paint

It's simply the best scanner control software on the market today, incorporating each scanner's individual commands and functions completely from Windows 3.0. It supports scanners manufactured by Canon, HP, IBM, Microtek, Logitech, Ricoh, and dozens more. Images (the size and number of which are limited only by disk space) can be scanned and manipulated using Image-In Scan and Paint. This portion of the system provides a host of sleek power tools — pencil, brush, eraser, airbrush, magnifying glass, along with the ability to create lines, rectangles, circles, ellipses, polygons, patterns, curve smoothings and easy text insertion. The system will automatically adjust itself if you're working with a gray-scale scanner and is fully compatible with a wide variety of popular formats such as TIF, EPS, GEM, Pagemaker, Ventura Publisher, MS Paint, PC Paintbrush, CorelDRAW! and more. Performance is fast, accurate and problem-free.

Image-In Plus

Now Windows users can perform sophisticated gray-scale editing and processing (comparable to that of Image Studio and Digital Darkroom on the Mac) using a unique set of powerful tools previously unavailable. Your pages will sing with clarity and sharpness, unlike anything you've ever published, because you've got total control of each visual you include. Image-In Plus puts an electronic darkroom at your fingertips, providing complete support for virtually all today's gray-scale scanners, and reduces complex processing of gray-scale images to utter simplicity. You can quickly adjust contrast and brightness, manipulate selected areas of the image, soften, sharpen, blur, retouch and more — all with easy slide controls. And since all of these functions are handles on disk, Image-In Plus doesn't drain your memory.

Image-In Vect

Now you can convert images designed or drawn in bit-mapped formats to vector images for use in AutoCAD, In-A-Vision, Draw!, Designer, Pagemaker and others. Image-In Vect utilizes the planar memory schemes under Windows 3.0 to produce vectorial graphic objects, incorporating editing routines such as polyline approximation and Bezier curve approximation to prepare files for seamless export. Image-In Vect is integrated with Image-In Plus, Scan and Paint (requires Image-In Scan and Paint to operate) to provide powerful tools for applications requiring drawing or photo editing, text insertion and gray-scale processing.

Image-In Read

The concept of OCR (Optical Character Recognition) allows users to simply scan printed text into ASCII format for use in other word processing documents. This method of text transfer will eliminate tedious re-keying of data.

Imagine being able to scan pages of text and have them instantly accessible for use in any application. Image-In Read is the most advanced, easiest-to-use and most reliable we've seen. It recognizes and accepts all IBM character sets and symbols regardless of size. Its flexible user interface actually allows you to edit text during the scanning process!

No other OCR system we tested offers the ease of use that is engineered into Image-In Read. Automatic separation of kerned pairs assures precise conversion of bitmapped text to ASCII text. *(This program requires Image-In Scan and Paint.)*

Image-In Panorama

This portion of the Image-In system ties all of the other systems together by providing a fast, easy management tool for all of your images. Image-In Panorama keeps track of the location of each image, and, when you select one from its list, will display a small representation of it on screen.

IMAGE-IN INCORPORATED

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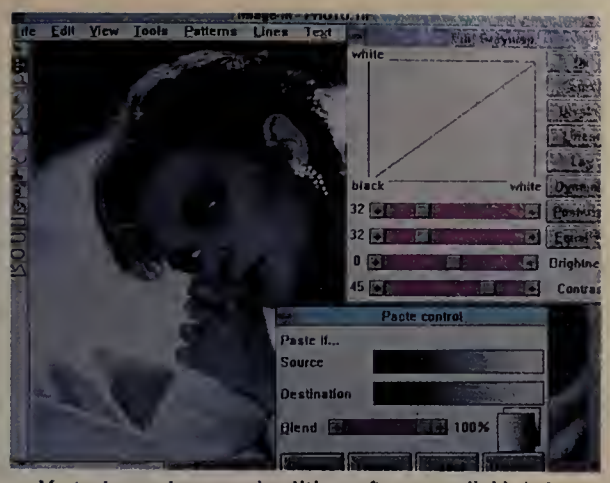
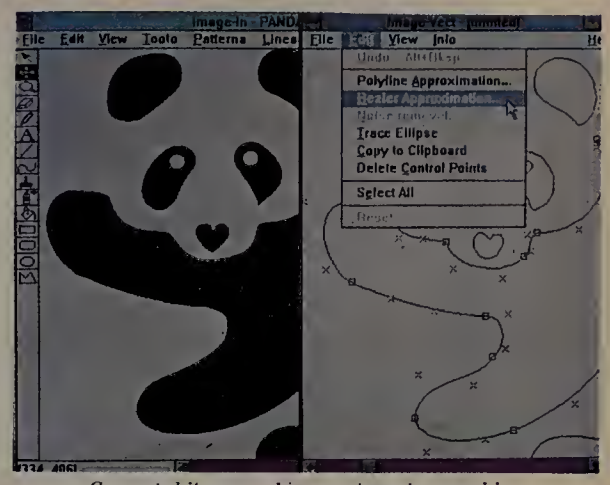
UY 9816	**Image-In Scan & Paint**	$149.00
UY 9817	**Image-In Plus** (requires Scan & Paint)	$349.00
UY 9818	**Image-In Read**	$349.00
UY 9819	**Image-In Vect**	$349.00
UY 9820	**Image-In Panorama**	$99.00
UY 9821	**Full Pack** (All of the above)	$795.00

IBM AT or compatible, 640K (1Mb recommended), Windows 3.0 and hard disk.



Most advanced gray scale editing software available today.



Converts bit-mapped images to vector graphics.

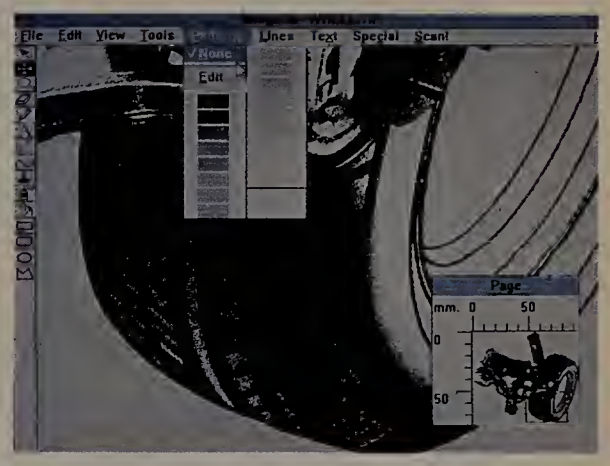


Image-In enhances images with a variety of powerful tools.

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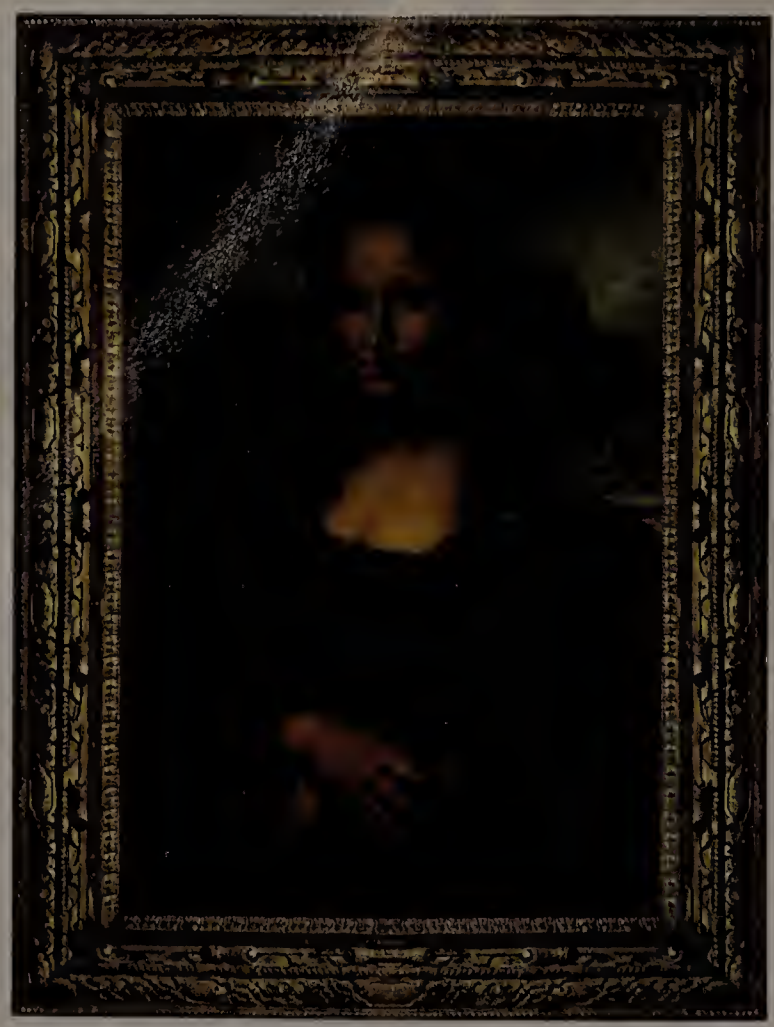

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The industry standard. With microLaser and PostScript, you can access more than 600 high-quality typefaces and over 4,000 software applications. It's also compatible with the HP LaserJet® Series II and allows you to switch between the HP and PostScript modes easily. Plus, you can connect microLaser to your PC, Macintosh® or virtually any type of computer hardware.

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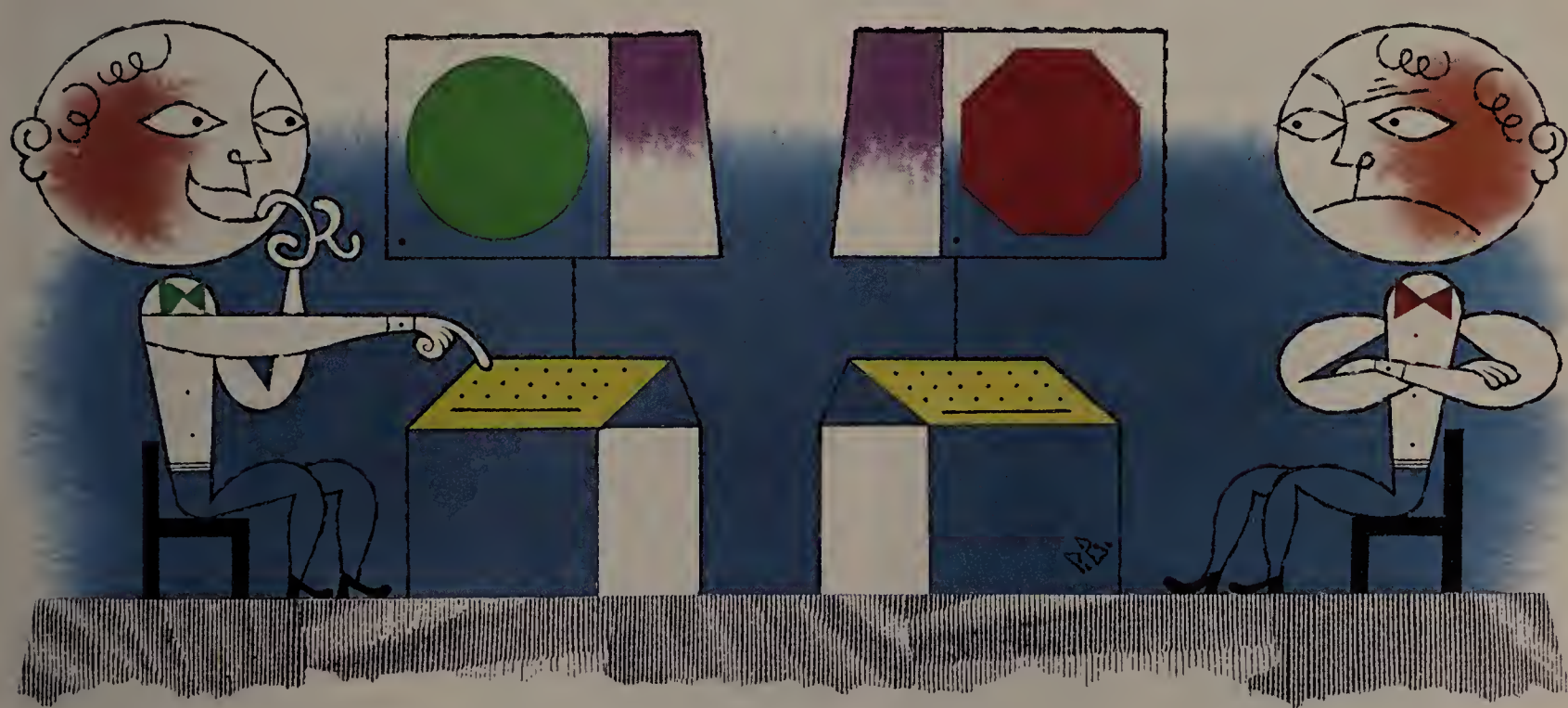
Can You Do Better Than NetWare?

NetWare 286 has ruled the roost for years, but networks have grown. We test Microsoft LAN Manager, Banyan's VINES, and Novell's own NetWare 386 and tell you whether they offer enough speed and reliability for today's demanding LANs.

Robert Lauriston



PHIL ANDERSON

Over the last few years, the network operating system (NOS) of choice has been Novell's 286-based Advanced NetWare. The reason is obvious: NetWare's relative reliability, software compatibility, and capable administrative and security tools mean the LAN stays up, users keep working, and the business keeps making money.

Advanced NetWare 286 was the Best Buy in *PC World*'s last NOS roundup in June of 1989, but since then, users' increasing LAN demands have stretched the program to its limits. As you load up your server with ever more users, disks, network boards, and printers; add server-based programs such as print and backup services; and tack on Macintosh support, NetWare 286's memory management can falter. This results in workstations temporarily losing their link with the network, and even server crashes—bad news for users, administrators, and the managers who have to pay high-priced consultants to keep the LAN running.

Advanced NetWare 286 is still a top value for small LANs, as is the slightly more advanced version reviewed here, SFT NetWare, but this time around the 286-based

NetWare loses its Best Buy crown. We've taken a close look at three NOS contenders that, unlike SFT NetWare, tap the superior memory management and multitasking abilities of the 386 and 486 chips: Novell's NetWare 386 3.1, Microsoft's *LAN Manager 2.0*, and Banyan's VINES 4.0. In the end, we found the powerful NetWare 386 to be the Best Buy for the LANs of the nineties.

Before you buy, keep in mind that you may not need a powerhouse, server-based NOS at all. Small LANs of 20 or fewer users may be better served by a simple, inexpensive peer-to-peer NOS. With a NOS like Artisoft's *Lantastic*—a *PC World* Best Buy—there's no centralized server; each workstation takes its turn providing the network with services. A dedicated server NOS is imperative, however, with a multiuser data base or accounting package. Also, server NOS's are faster on large networks, and they let you back up the LAN from a central location.

Reliability First

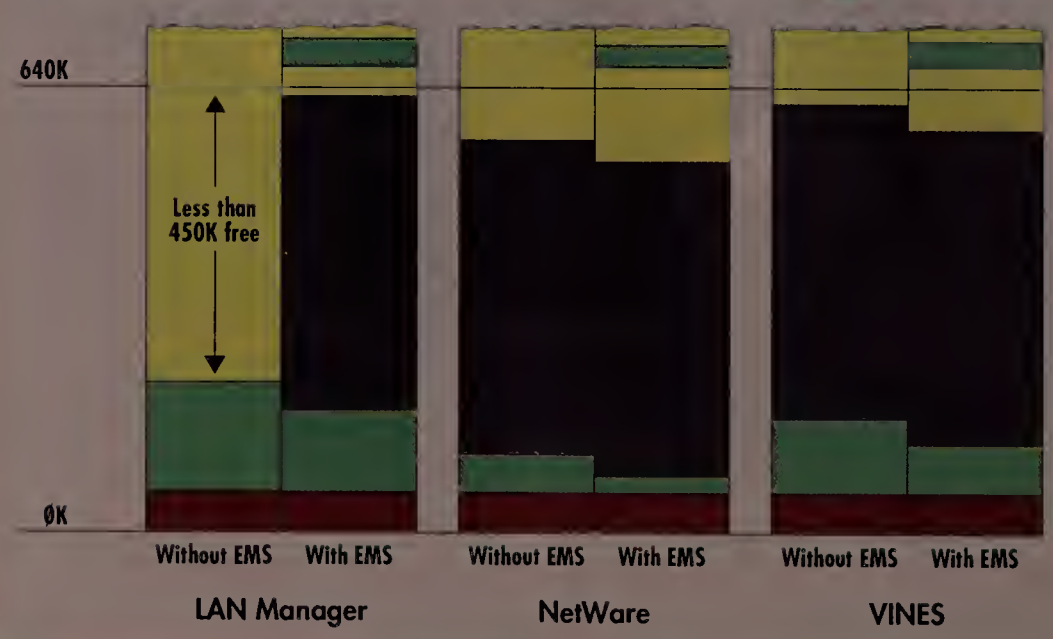
The key consideration when buying a server-based NOS is reliability, followed by workstation requirements and performance. First and foremost, reliability means good memory management—without it, adding more users and multiuser applications can cause workstations to lose their connections and servers to crash. Reliability also means compatibility—the NOS should work well with popular multiuser applications. Even if incompatibilities are the fault of the application software vendor, responsibility lies chiefly with the NOS vendor to perform careful compatibility testing and ensure that no problems arise. Reliability also demands "fault-tolerant" features, like disk duplexing (reading the same data to two drives and controllers), which can protect your data from being scrambled by hardware failures. We found NetWare 386 to be the most reliable NOS tested—the deciding factor in awarding it a Best Buy.

Workstation requirements are also crucial. If the network drivers gobble too much memory on each PC, you won't be able to run memory-hungry applications and RAM-resident utilities. It seems a simple thing, but a 50K difference in driver size can mean the difference between top productivity and outraged, inefficient users.

Performance is important, especially if you run multiuser applications—users accustomed to fast PC applications won't put up with excessive delays from their LAN software. More important, performance affects how many users you can add before you need to buy a second server. The PC World Test Center benchmarked each NOS with various applications on 6-, 12-, and 24-workstation networks. (Since each station worked about twice as fast as a normal user, the tests actually estimate performance with 12, 24, and 48 users.) On small LANs, scores were fairly similar with the exception of *LAN Manager*, which dragged behind. On the 24-station tests, however, NetWare 386 pulled away from the pack, while VINES slowed and *LAN Manager* bogged down considerably.

The exact point at which you'll need to move to a new server depends on your LAN hardware, usage profile, and willingness to put up with delays. Based on our test results, with *LAN Manager* or VINES, you'll probably want to add a new server somewhere between 25 and 50 users. The 286-based SFT NetWare can handle somewhat more, and with NetWare 386, you can add over 100 users. Some may argue that it's safer to have three 50-user servers instead of a single server that can shut down 150 users if it fails. On the other hand, adding a new server costs money (from $5000 to $20,000 for the hardware alone), and it heightens the complexity of administration.

After performance, administration is next in importance. Flexible administrative tools can translate into fewer hours spent installing and tuning your LAN (or paying someone else to) and less downtime. If you have more than



Despite the fact that Windows and other modern applications can take advantage of additional extended or expanded memory over the base of 640K of conventional memory, that 640K is as crowded as it ever was—especially if you're on a network. Each workstation's network drivers take up between 56K and 158K without high memory installed and between 25K and 118K with it. When you also add DOS drivers and other overhead, that doesn't leave much. For example, with LAN Manager's 158K slice of the pie, you wouldn't be able to run a 450K program like dBASE IV 1.1. You could run it if you had high memory, but even then you probably wouldn't have room to run a RAM-resident program or special device driver, say for a high-end video card.

NetWare 386: Power Where You Need It

Best Buy NetWare 386 dominates every features category except multiserver support, where VINES's distributed name service makes it much easier to set up and coordinate multiple servers.

● Yes
○ No
◒ Deficient

	Microsoft LAN Manager	NetWare 386 3.1	SFT NetWare 2.15c	VINES 4.0
Standard features				
List price per server				
for 10 users	$1990 [1]	$7995	$4995	$2495
for 25 users	$2985 [1]	$7995	$4995	$5995
for 50 users	$5495 [1]	$7995	$4995	$5995
Minimum server RAM required	5MB [2]	4MB	2MB	4MB
486-aware	●	●	○	● [3]
Copy protected	○	●	○	● [4]
Reliability				
Back up server to tape	●	●	●	● [5]
Hard disk "hot fix"	●	●	●	●
Disk mirroring and duplexing	●	●	●	○ [6]
UPS monitoring	●	●	●	●
Transaction tracking	○	●	●	○
Workstation support				
RAM consumed on each workstation	158K	56K	56K	108K
Base RAM left free with/without expanded or extended memory [7]	462K/422K	555K/524K	555K/524K	509K/472K [8]
Workstation disk space required	4MB	75K	75K	262K
Diskless workstation support	◒ [9]	●	●	●
Macintosh support	○	◒ [10]	●	○
Administration				
Menu-driven administration interface	◒ [11]	●	●	●
Manage network from workstation	◒ [12]	●	◒ [13]	●
		BEST BUY		

[1] With user-level security, HPFS386 file system, and "enhanced" workstation software.
[2] 9MB recommended.
[3] Available at extra cost.
[4] Pass-through key must be attached to server's parallel port.
[5] Can run only backup and restore utilities at server.
[6] Available at extra cost via third-party add-on.
[7] After loading Compaq DOS 3.31 (580K free before loading network software). Expanded memory manager tested was Windows' HIMEM.SYS.
[8] Expanded memory only.
[9] Over Token-Ring only, not Ethernet or Arcnet.
[10] Macs on NetWare 286 server can access 386 server on same LAN.

	Microsoft LAN Manager	NetWare 386 3.1	SFT NetWare 2.15c	VINES 4.0
Administration (contd.)				
Security				
Restrict individual files	●	●	○	○
Limit application to specified no. of users	●	●	○ [6]	○
Require regular password change	●	●	●	●
Restrict log-in time and workstation	●	●	●	●
Service and support				
Telephone support	$250/call [14]	$200/hour [15]	$200/hour	$2995 to $4043/yr. [16]
Daily support (hours)	10	24	24	24
Sat./Sun. support (hours)	○ [17]	24/24	24/24	24/24
On-site support	○ [17]	●	●	●
On-line support	● [3]	●	●	● [3]
Resource sharing				
Menu-driven user interface	●	●	●	●
Peer-to-peer printing	◒ [18]	●	●	● [3]
Share modem	◒ [11]	● [6]	○ [6]	●
Log-in via modem	○ [6]	● [3,19]	● [3,19]	● [3]
Maximum server disk storage supported	16,384GB	32,768GB	2GB	unlimited
Maximum server RAM supported	16MB	4096MB	12MB	16MB
Multiple-server support				
Manage servers as group	●	●	○	●
Distributed name service	○	●	○	●
File replication service	●	●	○	○
LAN-to-LAN WAN communications	○ [6,19]	● [3]	● [3,19]	● [3]
		BEST BUY		

[11] Only at OS/2 workstation.
[12] Same tasks must be performed at individual workstations.
[13] Same tasks must be performed at server.
[14] 30 days free; then $2495 per server for every 10 incidents reported by the same person (also includes 10 hours of BBS time).
[15] Free support during initial installation only.
[16] Per server, depending on hours and days required (includes BBS access).
[17] Via dealer: Same variation will be found from one dealer to another.
[18] OS/2 workstation can share printer with one user.
[19] Requires dedicated PC.

BUYING SMART: SHOPPING FOR A LAN OPERATING SYSTEM

Knowing what to look for (and avoid) in a NOS can mean big savings. Here are the key buying issues, listed in order of importance.

RELIABILITY

If your server goes down, it costs you time, money, and maybe even data. Your NOS should provide good memory management to prevent disconnected workstations and crashed servers.

Make sure the NOS is compatible with the multiuser software you plan to use. Look for fault-tolerant features that can help minimize the damage if the software or hardware does fail. The crucial feature is disk duplexing, which ensures against data loss by storing data to two drives, each on a separate controller —it can speed up disk reads in the bargain.

Also helpful is a "hot fix" feature that automatically locks out bad disk sectors as they occur, and the ability to monitor an uninterruptible power supply (UPS) so it safely shuts down the server after a power failure. In addition, you'll want to be able to perform full-system tape backup from any workstation. If your data base or accounting software supports it, a transaction-tracking system lets you roll back uncompleted transactions after a crash.

WORKSTATION REQUIREMENTS

Since every byte used by network drivers robs memory from local applications and RAM-resident utilities, look for a light RAM ante. To use workstations without hard drives, you must be able to fit all log-on files onto a floppy disk. If you have diskless workstations or Macintoshes, look for a NOS that supports them.

PERFORMANCE

You'll want a NOS that won't slow down multiuser software or bog down as more users log on—otherwise, you'll be twiddling your thumbs every time you launch a network application or update a data base (see the PC World Test Report).

ADMINISTRATION

Good administrative tools mean faster troubleshooting, less profit-dousing downtime, and perhaps a smaller support staff. Menu-driven installation and automatic configuration are a plus—imperative if you have to install the NOS yourself. Your administrator will also need flexible tools for managing applications, users, and groups. You should be able to assign and manage group or individual rights by directory, or directory rights by group. Restricting access to files is important, and not just for security—to help run some programs that are not specially designed to run on networks, you should be able to assign rights to individual files and make a subdirectory of a shared volume appear as a root directory.

Make sure there are good auditing and troubleshooting utilities, plus full documentation of all error messages. The administrator should be able to run all utilities from any workstation. Remote modem access can save you money and time if you count on outside help.

SERVICE AND SUPPORT

Technical support should be fast, affordable, and available by phone, modem, or on-site visit. You'll need access to user groups, training, and newsletters, and you should expect prompt notice of bug fixes and major upgrades.

RESOURCE SHARING

If users find it hard to work with the network, you're losing the productivity boost the LAN was supposed to provide. Buy a NOS that offers modem sharing and lets users share printers attached to workstations (not just those hooked to the server). Menu-driven utilities for users to connect to remote drives, manage print jobs, and so on are nice but not critical. If you need gigabytes of disk space for lots of shared applications or data files, look for a NOS that can handle it—plus about a megabyte of additional RAM for caching each 100MB of added storage.

MULTIPLE-SERVER SUPPORT

Special tools for managing multiple servers will save administrators lots of time. You should not have to waste time setting up user and group accounts separately for every server. A distributed name service lets you move applications or data files between servers without having to change log-in scripts or batch files. Wide-area links let you hook geographically dispersed servers with leased data lines. —*R. L.*

one server, look for good tools for coordinating them. Finally, a NOS should offer flexible features for sharing resources across the LAN, such as printers, modems, and storage, and the NOS vendor should offer flexible pricing and solid service and support.

Here's the latest and greatest in the world of high-powered LAN operating systems. Weigh the factors carefully—this may be the most important buying decision you'll make all year.

Microsoft LAN Manager 2.0

PROS: Flexible pricing, multiple-server tools

CONS: Compatibility problems, large RAM requirement, hard to install, slowest in the roundup

Earlier versions of *LAN Manager* were created by Microsoft but modified and sold by 3Com, IBM, and NCR. For the first time with version 2.0, Microsoft is selling *LAN Manager* directly, and the company bills its OS/2-based baby as the future of networking. Given the company's clout, Microsoft may make good on that promise, but for now the reality falls short.

LAN Manager 2.0 consumes more workstation RAM and runs far slower than its rivals, and although it had been shipping for months, we uncovered severe software-compatibility problems. Despite solid multiserver support and a flexible pricing scheme that starts at a low $995 for a server's first five users plus $995 for each additional ten users, *LAN Manager* is a poor value.

During testing, bugs kept *1-2-3* and *Paradox* from running. By press time, Microsoft technicians had solved the *1-2-3* conflict (and promised to ship a free bug fix) but were still working on the *Paradox* problem. A still-unidentified bug that randomly hung workstations prevented *LAN Manager* from completing our multiuser *Paradox* test. Most likely those glitches will be solved by the time you read this, but you should make sure your software works with it before you buy.

Microsoft's support offers some compensation for *LAN Manager*'s technical problems. You get 30 days of free phone support—after that it's $2495 per 10 "incidents," which also covers 10 hours on a *LAN Manager* BBS. There's no evening or weekend phone support, however, and you're dependent on your dealer for on-site help.

Even if it were bug free, *LAN Manager* would be a questionable buy. On each workstation, it consumes a whopping 158K of RAM, so you may not be able to run some RAM-resident programs, and you'll need extended memory to run *dBASE IV*. In addition, each PC must surrender 4MB of disk space, so you won't be able to log on from a floppy-only PC unless you use the limited low-overhead version. There's no Macintosh support, and you can run diskless workstations only on Token-Ring hardware, even though Ethernet is the norm on most LANs.

The ability to share resources such as printers, modems, and storage is limited. Only OS/2 workstations can share their drives and printers with others, and then with only one other DOS or OS/2 user at a time. To use a workstation's printer, you have to wait until it's free, enter a command to share it, print, and then enter another command to free the printer for the next user.

While VINES and the two NetWares were up and running an hour or two after we opened the box, *LAN Manager*'s installation was brutal. Only after seven full working days of fiddling with configuration files, many phone calls to Microsoft, and a visit by a Microsoft engineer was *LAN Manager* able to run our test suite. The installation instructions are unclear. For example, the instructions don't warn you that before you can use log-in scripts, you must set up a domain (a named group of servers), even if you have only one server.

Administrative tools are below average. You can run the administrative menu only from an OS/2 workstation—otherwise you're stuck with a command line. Sharing drives requires an extra step because server volumes aren't automatically available.

LAN Manager bests NetWare 386 in its centralized administration of multiple servers—but it's no match for VINES. Unlike the NetWares, *LAN Manager* lets you manage servers as a group, so administrators don't have to key in the same data repeatedly. However, this plus is offset somewhat by the fact that the administrator must set several defaults at each workstation, a headache that grows with the size of the LAN.

In its present state, *LAN Manager 2.0* is close to unusable. Once the bugs are chased down, performance is improved, and RAM requirements are lowered, it may prove to be a good value, especially if you're planning on an all-OS/2 office. But for now *LAN Manager* is not recommended.

NetWare 386 3.1

PROS: Fastest in roundup, modest RAM and disk requirements, easy administration, supports lots of storage and RAM

CONS: Expensive, no Mac support, limited multiserver controls

Thanks to its 32-bit architecture, NetWare 386 is a powerhouse that can tap the latest 386 and 486 systems' enormous reserves of RAM and disk space. NetWare 386 takes top honors in our performance tests, and it robs little RAM or disk space from each workstation. Unlike the original NetWare 386, version 3.1 is stable and open for business. Considering the $7995 price tag, buyers with smaller LANs may want to stick with SFT NetWare and upgrade later, but NetWare 386 is the Best Buy for most users.

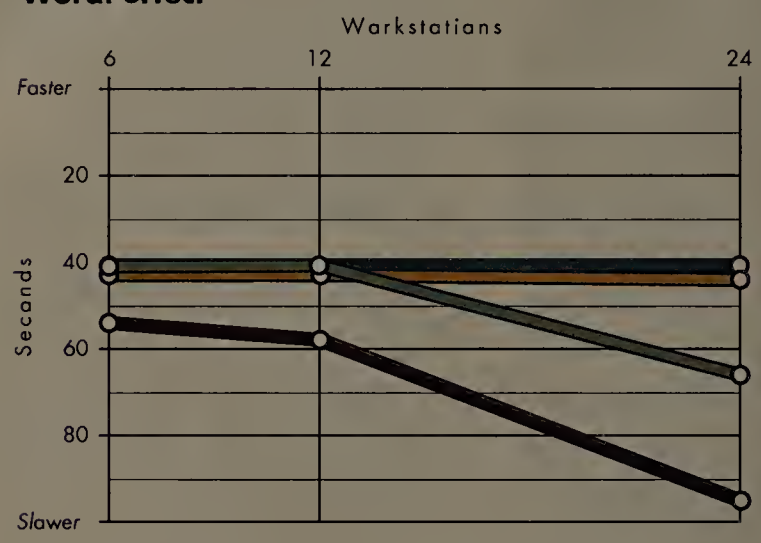
Thanks to its support for huge amounts of RAM and disk space, NetWare 386 can support more workstations running off a single server than any other NOS—Novell has demon-

PC WORLD TEST REPORT

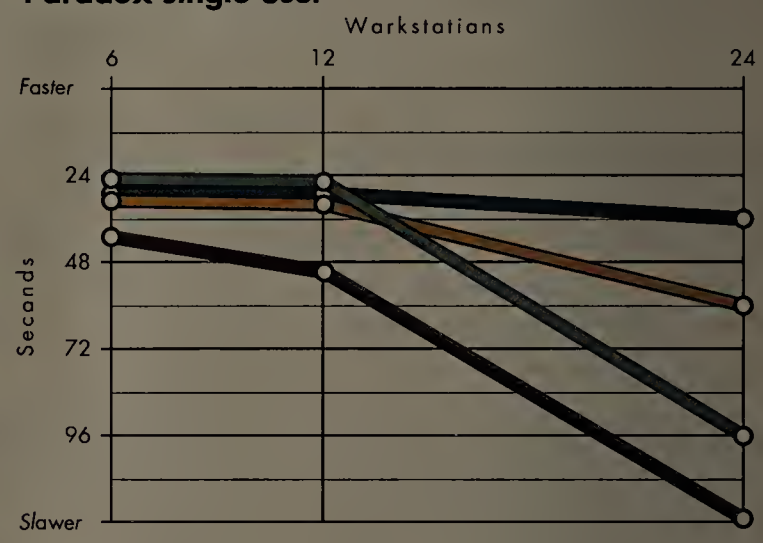
The Bigger the LAN, the Harder They Fall

NetWare 386 keeps on humming no matter how big the LAN. When the going gets tough, VINES and especially LAN Manager slow more dramatically than the two NetWares.

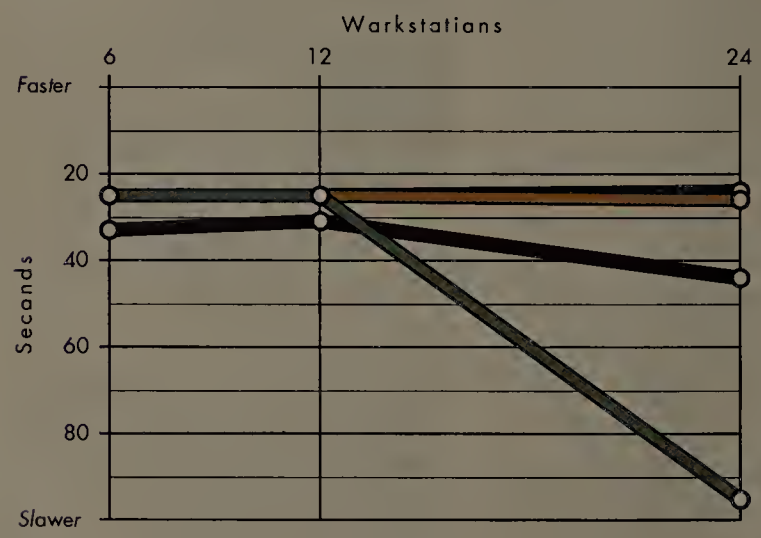
WordPerfect



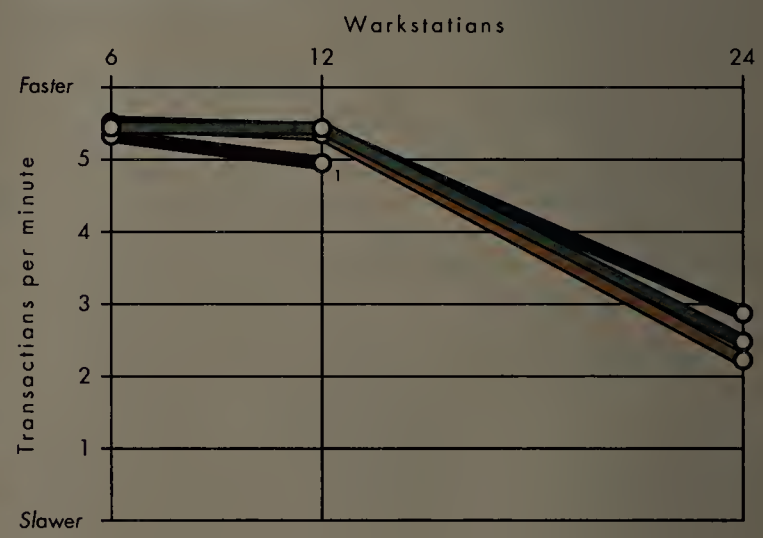
Paradox single-user



1-2-3



Paradox multiuser



Microsoft LAN Manager 2.0
NetWare 386 3.1 BEST BUY
SFT NetWare 2.15c
VINES 4.0

[1] We were unable to complete the 24-workstation test using LAN Manager.

Methodology
A Compaq Deskpro 386/25 with 12MB of RAM and a 300MB hard disk was used as the server on an Ethernet network. Tests were performed on networks configured with 6, 12, and 24 workstations. Workstations ran different applications simultaneously to simulate the typical operating patterns of a normal LAN. Tests run about twice as fast as a normal user would perform the job, so results estimate the performance of LANs twice the size of each test LAN—in other words, networks with 12, 24, and 48 workstations. The results for each workstation group were added together and averaged.

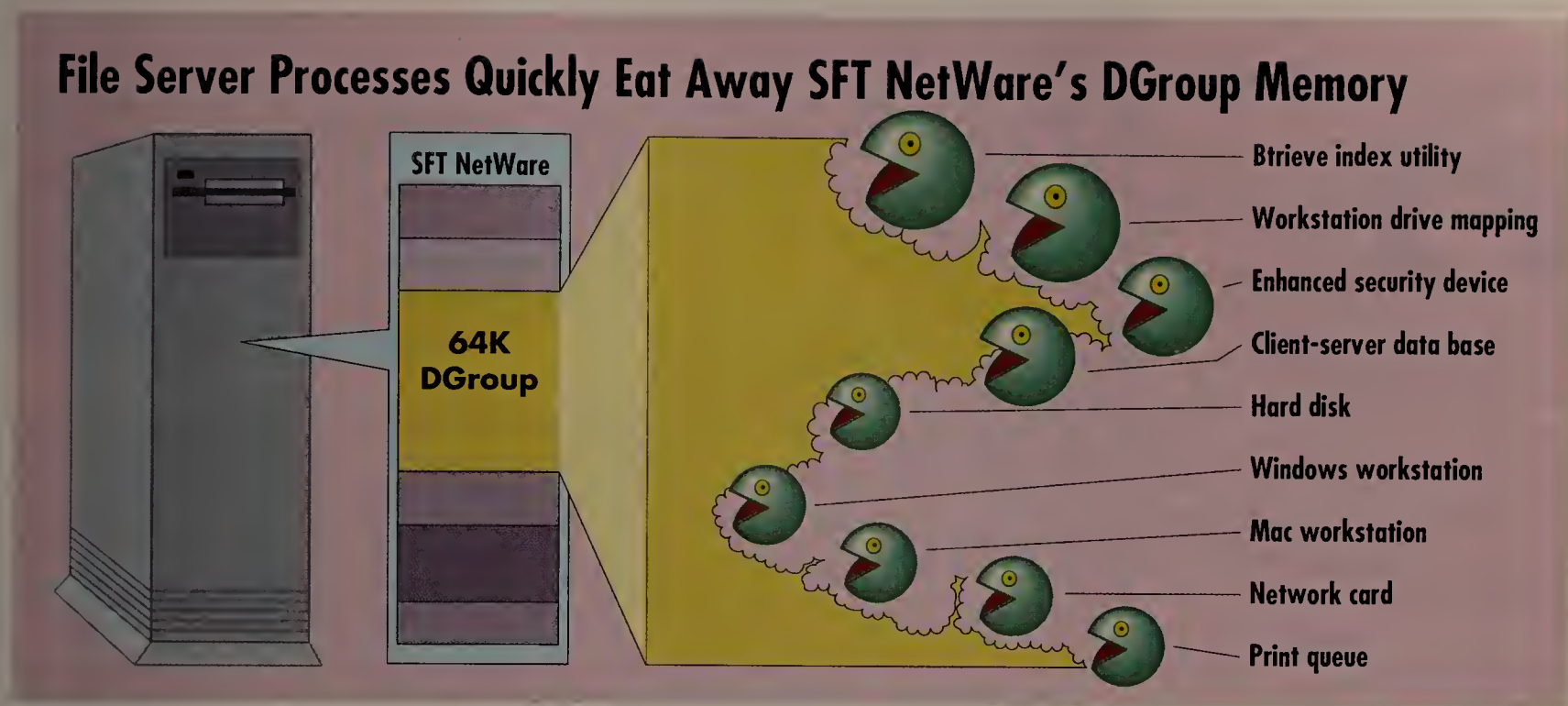
WordPerfect
The multiuser version of *WordPerfect 5.1*, installed on the server, is launched by each workstation. Then three separate documents varying in size from 5K to 100K are loaded. A spelling check is performed on one, and pauses are interspersed to simulate normal use before each document is saved. Only the load and save times are measured.

1-2-3
The multiuser version of *1-2-3 2.2*, installed on the server, is launched by each workstation. Then three separate worksheets varying in size from 25K to 100K are loaded, and various changes are made and recalcs run on each. Finally, the worksheets are saved. Only the load and save times are measured.

Paradox single-user
The multiuser version of *Paradox 3.0* is installed on the server. Each workstation launches the application, and a table is copied into a private subdirectory on the server. The table is viewed, and typical operations, such as locating and adding records, are performed.

Paradox multiuser
The multiuser version of *Paradox 3.0* is installed on the server. Each workstation launches the application, and starting with an orders table, 50 records are compared with an available stock table, where the current prices for items are found. The resulting records are inserted into an invoice table.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



SFT NetWore works greot os long as you don't overlood it with services. Just obout every setting ond task on on SFT NetWore server tokes at leost o small bite out of its cruciol 64K block of "DGroup" memory. As you lood up o server with disks, network boords, printers, mopped directories, ond Volue-Added Processes (VAPs)—server-bosed opplicotions such os Btrieve—you con run out of DGroup memory long before you run out of RAM. As a result, you're more likely to encounter slowdowns ond system croshes. In controst, NetWore 386, VINES, ond LAN Manoger dynomically ollocote os much RAM os needed for each tosk ond driver.

strated 250 busy workstations sharing 10 gigabytes (GB) of data on one server. (VINES and *LAN Manager* support thousands of gigabytes of storage, but because they're limited to 16MB of RAM, they lack sufficient memory to disk cache more than a few gigabytes.)

To the user, NetWare 386 looks just like NetWare 286—you can keep your customized menus, and you won't need to retrain NetWare users. In fact, you can even mix the two NOS's on the same network. Network drivers take up only 25K of conventional RAM if expanded or extended memory is available and 56K if not, and disk files consume only 75K per workstation. Unfortunately, there's no Mac support.

If your only experience with setting up and maintaining a LAN comes from NetWare 286, you're in for a pleasant surprise. Installation is a snap—you just create a small DOS partition on the server's hard drive, copy a few files onto it, and enter some simple commands; a menu-driven utility walks you through the rest. You can alter board and disk drivers without stopping the server, allowing you to resolve hardware conflicts quickly and easily. An automatic conversion utility eases upgrading from NetWare 286.

Administrative utilities are superb. A unique "virtual console" lets the administrator remotely control the server from any workstation, checking usage statistics and troubleshooting problems. Controlling individual and group access is easy, and there are plenty of tricks for taming misbehaved network software.

At press time, NetWare 386 lacked multiple-server tools—you must maintain user accounts and access rights separately for each server. However, a *LAN Manager*–style domains feature is expected to ship soon. Novell also sells wide-area links for hooking scattered LANs together via leased lines.

Novell offers the best support in the roundup, including (for a price) 24-hour-a-day phone support. For details, see the sidebar "Where to Get the Best NetWare Support."

Once Novell adds multiserver support to NetWare 386, there will be little reason—save price—to go elsewhere. With its top speed, solid support, unquenchable capacity, and sturdy reliability, it's a Best Buy for all but the smallest LANs.

SFT NetWare 2.15c

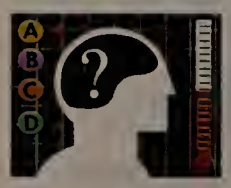
PROS: Modest RAM and disk requirements, Mac support, wide software support

CONS: Not reliable on large networks

To corporate America, networking and NetWare are synonymous. The acme of Novell's tried-and-true 286 line is SFT NetWare, a more fault-tolerant version of Advanced NetWare 286. SFT NetWare is faster than average, it's the only NOS reviewed here that hugs its Macs today, and at $4995, it's reasonably priced. Software compatibility may also be an issue if you want the latest software right when it ships—most multiuser applications appear first for NetWare 286 and 386 and only later for VINES and *LAN Manager*. It's also easy to find administrators and consultants who are familiar with the environment. Alas, SFT NetWare has one big problem—on large, busy servers, its poor memory management can cause slowdowns and workstation errors and even crash the server itself (see "File Server Processes Quickly Eat Away SFT NetWare's DGroup Memory").

SFT NetWare is not known for easy

Rate Your Network IQ



We know you're no dummy, or you wouldn't be reading this magazine. But how much do you know about networks? Unless you're a network administrator or a LAN consultant, it's probably not your job to install or maintain servers, multiuser applications, and network operating systems. What you know, you've picked up secondhand—with luck, from reliable sources.

The object of this quiz is fun, mainly. On the other hand, you need to know what LAN professionals are doing so you can judge their performance and understand what is and isn't possible. Use this quiz to improve your network vocabulary, and you may avoid getting that glazed look when the guy with a handful of coax cable complains about the size of your network drivers.

The answers are listed at the bottom of the page. Here's how to interpret your score based on the number of correct responses:

1 to 3—log on, but very carefully;
4 to 6—you've discovered the joy of funny E-mail messages;
7 to 9—people ask you what the problem is when the network goes down;
10 to 12—hang out your LAN consultant's shingle!

1) RAM cram occurs when

a) a multiuser application runs out of virtual memory.
b) a server runs out of room for memory chips or memory boards.
c) the network operating system's memory buffers overflow.
d) a network driver leaves a workstation short on memory.

2) NetWare 386 supports the following amount of server RAM:

a) 16MB.
b) 4096MB.
c) 32MB.
d) 2MB.

3) A file server is to an application server as

a) disk intensive is to processor intensive.
b) a back end is to a front end.
c) a 486 is to a 386.
d) a tower PC is to a desktop PC.

4) The difference between disk duplexing and disk mirroring is,

a) duplexing requires two controllers, mirroring only one.
b) mirroring costs less.
c) duplexing is safer.
d) all of the above.

5) A 3270 gateway and a 3174 controller are alike in that they both

a) use twisted-pair cable.
b) enable LAN workstations to access a mainframe without using a front-end processor.
c) offer approximately the same-speed link to a mainframe.
d) require that PCs run terminal emulation software.

6) MHS stands for

a) Message Handling Service.
b) Main Host Server.
c) Mainframe Host Station.
d) Mail Handling System.

7) If you want to link your LAN to a remote LAN, and your network operating system uses a distributed name service,

a) you'll need to specially address E-mail to reach the remote LAN.
b) the administrator must set access rights user by user.
c) you can access user names to help you address E-mail.
d) it's much easier for the administrator to set up a second server.

8) The difference between a clustered host and an access server is,

a) a clustered host is for dialing out, while an access server is for dialing in.
b) a clustered host has more processors.
c) clustered hosts are compatible with token ring LANs; access servers must use Ethernet.
d) clustered hosts use synchronous modems; access servers are connected directly to leased lines.

9) A serial LAN is to a bus LAN as

a) a token ring LAN is to a star LAN.
b) light traffic is to heavy traffic.
c) a serial connection is to a parallel connection.
d) a node is to a cluster controller.

10) Value-Added Process is

a) NetWare 286's name for a back-end application.
b) one way to implement MHS.
c) sometimes an effective way to cut down on RAM cram.
d) all of the above.

11) NetWare's SYSCON menu enables administrators to

a) set user groups' access rights.
b) route remote users' requests.
c) establish restricted subdirectories on workstation hard disks.
d) back up a network without shutting it down.

12) Novell's Print Server is

a) NetWare 386's replacement for PRINTDEF and PRINTCON.
b) a utility that provides peer-to-peer printer sharing.
c) a pop-up utility that enables you to change print parameters.
d) used to consolidate all workstation printer drivers on a server.

Answers: 1) d; 2) b; 3) a; 4) d; 5) d; 6) a; 7) d; 8) b; 9) b; 10) d; 11) a; 12) b

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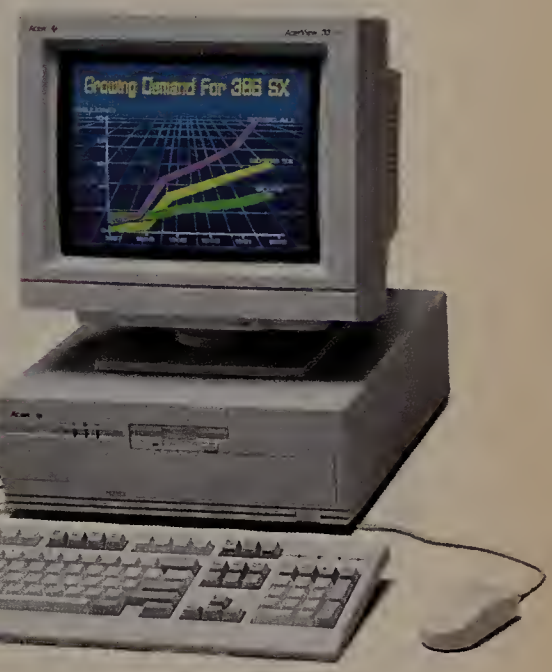

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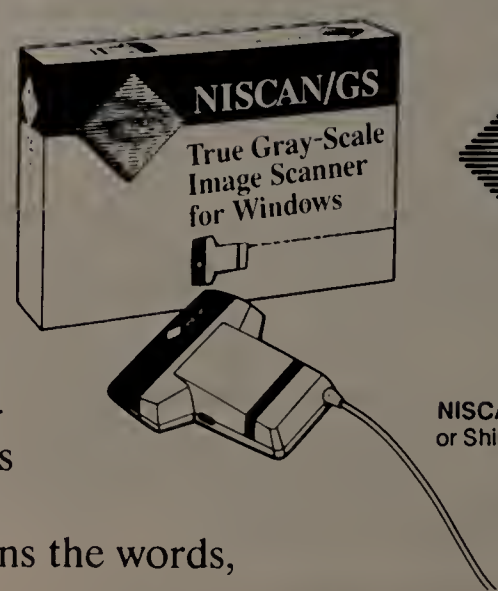

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administration. It lacks a remote console utility, so you must enter many commands at the server. Installation and configuration are complex and tedious. If you encounter memory problems, you'll have to shut down the server while reallocating and tuning. Unless you're sharing the LAN with a NetWare 386 server, you cannot assign full supervisorial rights over a group of users or a drive volume or other shared device.

SFT NetWare is fast on small LANs but runs out of steam as the number of users increases. On most tests, it was no more than 5 percent slower than NetWare 386, but in the *Paradox* tests, it drooped seriously with 24 workstations (equivalent to 48 users). SFT NetWare is also less suited for a high-volume server—it maxes out at 2GB of storage, well below the capacity of today's largest systems.

Though its memory management problems keep it from being a Best Buy, SFT NetWare's proven performance and superior workstation support make it a good choice for small to medium-sized LANs. If you don't need SFT's disk duplexing or transaction tracking, buy the otherwise-identical Advanced NetWare 286, which at $3295 costs a third less.

VINES 4.0

PROS: Easy to install and manage, excellent multiple-server tools and wide area network links

CONS: Large RAM requirement, fairly slow performance

Banyan's UNIX-based VINES 4.0 makes the complex task of installing and managing large multiple-server LANs surprisingly easy. Per server, this NOS costs $2495 for 10 users, $5995 for 25 or more users, and $14,000 for a version that takes advantage of the Compaq Systempro's dual processors, which promises to crank up performance. With a single processor, however, VINES's speed is unimpressive compared to the NetWares', so you may have

EXECUTIVE SUMMARY

Swift and Sure: Novell Still Rules the LAN

NetWare 386 pours on the power for today's big LANs.

As networks grow in size, the 286-based SFT NetWare becomes less reliable. But powerful new NOS's are ready to step in.

NetWare 386 wins a Best Buy thanks to its reliability, light workstation-RAM requirements, and fast performance. The 286 version of NetWare, **SFT NetWare 2.15c,** remains a good choice for small LANs, and Banyan's **VINES** is best suited for large, multiple-server networks.

	Microsoft LAN Manager 2.0	NetWare 386 3.1	SFT NetWare 2.15c	VINES 4.0
Reliability	Poor	Excellent	Foir	Good
Workstation support	Poor	Good	Excellent	Fair
Performance	Poor	Excellent	Good	Fair
Administration	Poor	Excellent	Foir	Good
Service and support	Foir	Excellent	Excellent	Good
Resource sharing	Foir	Good	Good	Good
Multiple-server support	Fair	Poor	Poor	Excellent
Price	Excellent	Fair	Good	Good
Overall value	Poor	Excellent	Good	Good
		BEST BUY		
Reader service no.	661	662	663	664

How we rate network operating systems
We rate network operating systems based on information in the Features Evaluation and the PC World Test Report, combined with our opinions of reliability, quality, and user benefit.

Reliability means the server and workstations don't crash, applications run properly, and the NOS protects your data from hardware failures. An Excellent rating requires compatibility with popular software packages, a full set of fault-tolerance features, record-level locking, efficient memory management, and reliable multitasking.

Workstation requirements primarily refers to the amount of RAM used by the workstation's driver and network shell. An Excellent rating reflects RAM requirements of 75K or less and support for floppy-only PCs, diskless workstations, and Macintoshes.

Performance ratings are determined by relative PC World Test Report scores, with the added condition that an Excellent rating requires that a NOS perform the 12-workstation test roughly as fast as the 6-workstation test and score no more than 50 percent slower with 24 workstations than with 12 workstations.

Administration includes all tools used to control the network. An Excellent rating demands the ability to run all administrative utilities from any workstation and restrict access to individual files. It also requires easy installation and day-to-day management, flexible security, and tools to troubleshoot and resolve LAN problems.

Service and support reflects the availability and cost of phone, on-site, and on-line support, as well as training and vendor certification of third-party support. An Excellent rating requires 24-hour telephone support seven days a week and unlimited free on-line support.

Resource sharing reflects usability of the workstation, the variety of sharable devices, and server storage and RAM capacity. To receive an Excellent rating, a NOS must let you share printers and modems attached to workstations and support at least 10GB of disk storage and 48MB of RAM.

Multiple-server support rates the quality of group server management utilities and wide-area links. An Excellent rating requires distributed name service and LAN-to-LAN links by leased line and modem.

Price ratings average the cost of four servers, one with 10 users, two with 25, and one with 50.

Overall value combines all of the above criteria, with extra weight given to reliability and workstation requirements.

WHERE TO GET THE BEST NETWARE SUPPORT

Your employees depend on the LAN to get their work done, so you need help *fast* when something goes wrong. Novell's authorized dealers bear most of the burden of supporting NetWare. But what if your dealer goes out of business or can't provide adequate support? Never fear—the nice thing about NetWare is you don't have to go far for help. Here are some options.

Phone Support
Novell's phone support is a steep $50 per 15 minutes, but it's available 24 hours a day, seven days a week. If an emergency leaves no other choice, call 800/526-7937. On your first call, have your Visa or MasterCard number ready.

NETWIRE
Novell's CompuServe forum recently dropped its surcharge, so you just pay the hourly CIS rate. Enter G NETWIRE at any prompt for technical assistance from Novell and other users, a file library of updates and patches, and NetWare news.

Certified NetWare Engineer
By passing seven tough tests, your administrator can become a Certified NetWare Engineer. CNEs get access to Novell's Technical Information Database and receive high-level phone support at the reduced rate of $40 per incident (since there's no per-minute charge, this is usually cheaper than Novell's phone support). Tests cost $70 each and are given in most major U.S. cities. Call 800/446-9554 (612/921-7415 in Minnesota) for details.

Novell-Certified Third-Party Support
Novell's referral service (800/526-5463) can direct you to an independent CNE or a "Novell Support Organization," an approved third-party service group with CNEs on staff. (Make it clear what you want, since the service's main job is referring prospective NetWare buyers to authorized dealers.) Most CNEs and NSOs offer only on-site support, but some provide phone support at rates lower than Novell's. You can also get on-site support from Novell's Services Division—but it will cost you about $200 an hour plus travel expenses.

User Groups and Publications
Novell sponsors the NetWare Users International user group (122 East 1700 South, Provo, UT 84606-9974). NUI membership is free and includes a subscription to *NetWare Connection*, a bimonthly newsletter with news, how-to tips, and a calendar of user conferences. NUI can refer you to a local affiliated user group or help you start one. An entirely Novell-independent alternative is offered by the Affiliation of NetWare Users (write c/o Open Systems Advisors, 268 Newberry St., Boston, Massachusetts 02116, or call 617/859-0859). Dues of $50 per year include a subscription to the group's bimonthly magazine, *LAN Street Journal*, and other services. *NetWare Advisor*, a monthly journal devoted to practical, in-depth tutorials for system administrators, is $105 per year (Business Systems Group, 24 Greenway Plaza #1305, Houston, TX 77046, or call 713/965-9000).

Training
To find a Novell-approved trainer, call 800/526-5463 and ask for a list of Certified NetWare Instructors (CNIs) in your area. Novell itself offers a score of courses throughout the country on various NetWare-related subjects for users, system managers, developers, and prospective CNEs and CNIs (call 800/233-3382). Novell also sells disk-based tutorials for supervisors for $300 to $600 (call 800/346-7177). —*R. L.*

to move to a second server sooner than you'd like. Nevertheless, VINES is a good deal if you have a large network with multiple servers or want to link scattered LANs.

The key to VINES's power is its distributed name service, StreetTalk, which makes the network hardware-independent. StreetTalk distributes a single data base of users, groups, and resources among all the servers on all your LANs, so you never need to enter a change in network access rights more than once.

If you have the proper access rights, StreetTalk lets you use any resource on the network regardless of its location. For instance, when a work group moves to a new city, you can transfer the group's shared and personal data simply by loading a backup tape onto a server at the new location. The group picks up right where it left off, using the same log-in procedure, personal directories, applications, and E-mail addresses. (With other NOS's, you would need to create new log-in scripts and addresses and reset every user's access rights.)

New in VINES 4.0 is Directory Assistance, which keeps on each LAN a copy of the full StreetTalk directory for the entire wide area network. Having a

local copy allows you to address E-mail to a remote user even if the two LANs are not currently linked; the message is stored and forwarded when the networks reconnect. (This year, *cc:Mail* plans to join Banyan's own Network Mail in adding support for StreetTalk addresses.)

Two minor dents mar VINES's reliability. Unlike its rivals, VINES won't let you duplex server drives to protect against hardware failures. (A third-party solution is available, but it doesn't provide the usual performance boost gained from simultaneous reads.) You must run VINES's backup and restore utilities at the server, so you can't restore files to a stand-alone PC if a fire, quake, or flood blocks access to your servers.

RAM cram can also be a problem—network drivers leave only 470K free (510K if you have extended—not expanded—memory). On the bright side, each user can share the server's modems, and extra-cost options let you share workstation printers and log on to the network by modem.

VINES's automatic installation gives it the easiest setup in the roundup. You can manage the network from any workstation (or even a remote PC) via a simple menu-based program. Tools for managing shared volumes could be better—for instance, you can't restrict individual files or make a shared subdirectory appear as the root.

Banyan's support is very good. Weekday telephone support costs $2995 a year, and for $4043 per year you get 24-hour support seven days a week. Though most support is provided by Banyan's systems-integrator resellers, you can also hire the company to set up your LAN, train your staff, and even manage your network remotely.

If you have a large, widespread network, VINES's superior multiserver controls and wide-area links make it a good buy. If Banyan improved performance and decreased RAM requirements, VINES could move up a notch.

NetWare, Yes—But Which One?

For most networks, NetWare is still the best choice—but which version should you use? Both demand less memory and disk storage than their competitors, and they share Novell's excellent service-and-support organization. Due to outdated memory management, however, NetWare 286 hands over its Best Buy crown to NetWare 386, the king of the jumbo-sized LAN. Meanwhile, VINES is the best choice for multiple-server LANs and WANs.

PC-based LANs are well on their way to replacing minicomputers as a platform for critical applications. Pick the right NOS today, and your company will be ready for those applications tomorrow.

Robert Lauriston is a contributing editor for PC World.

For more information about all products in this article, circle reader service no. 907.

WHERE TO BUY

Microsoft LAN Manager 2.0
Microsoft Corp.
One Microsoft Way
Redmond, WA
98052-6399
800/227-6444
LIST PRICE: 5 users $995, each additional 10 users $995, unlimited users $5495
REQUIREMENTS: for server, 5MB RAM (9MB recommended), OS/2 1.2 or later version; for workstation, 512K RAM (640K plus additional expanded or extended memory recommended), 4MB free hard disk space, DOS 3.1 or later version
TECHNICAL SUPPORT: 30 days free, then $2495 for 10 incidents, toll-free number, M–F 7–5
OTHER SUPPORT: BBS (10 hours connect time included in tech support package), training, newsletter
Reader service no. 661

NetWare 386 3.1
Novell, Inc.
122 East 1700 South
Provo, UT 84606
800/453-1267
LIST PRICE: $7995
ACCESSORIES: NetWare SQL/386 $1495, NetWare Link/X.25 $1750, NetWare Link/64 $1495, NetWare Link/T1 $3995, NetWare Access Server (dial-in) $1995
REQUIREMENTS: for server, 4MB RAM; for workstation, DOS 3.1 or later version
TECHNICAL SUPPORT: free assistance with installation, then $50 per 15 minutes, toll-free number, seven days, 24 hours a day
OTHER SUPPORT: CompuServe SIG (GO NETWIRE), user group, newsletter, training
Reader service no. 662

SFT NetWare 2.15c
Novell, Inc.
LIST PRICE: $4995
ACCESSORIES: NetWare SQL $595, NetWare Link/X.25 $1750, NetWare Link/64 $1495, NetWare Link/T1 $3995, NetWare Access Server (dial-in) $1995
REQUIREMENTS: for server, 2MB RAM; for workstation, DOS 3.1 or later version
TECHNICAL SUPPORT: same as NetWare 386 except no free phone support during installation
OTHER SUPPORT: same as NetWare 386
Reader service no. 663

VINES 4.0
Banyan Systems Inc.
120 Flanders Rd.
Westboro, MA 01581
800/828-2404,
508/898-1000,
508/898-1755 (fax)
LIST PRICE: 386 version $5995 per server (ten-user version $2495), 486 version $7490, multiple-CPU version $13,995
ACCESSORIES: Network Mail $995 per server, SMTP gateway $1495, MacVines (QuickMail) Gateway $795, PC Remote Dial-In $1495, VINES Network Management $995, PC Network Printing (peer printing) $495, server-to-server communications $1000, WAN server-to-server $1755, X.25 server-to-server $2495, TCP/IP server-to-server, client-server developer's tool kit $1995
REQUIREMENTS: for server, 4MB RAM (multiple-CPU version requires Compaq Systempro); for workstation, 640K RAM, DOS 2.1 or later version
TECHNICAL SUPPORT: nine plans ranging from $2995 per server per year for M–F 8–5 to $4043 for seven days, 24 hours a day; toll-free number
OTHER SUPPORT: BBS (included in tech support package), user group, newsletters, training, consulting
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More powerful graphics, dynamic linking between other Windows programs, and additional help and file compatibility for anyone familiar with Lotus 1-2-3, makes this a must for any serious Windows user. . $329.

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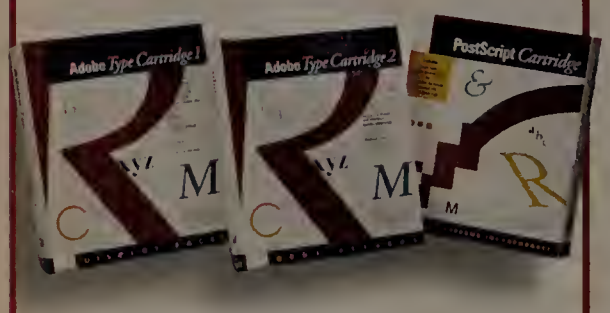
7547 ▣ Adobe Type Manager for Windows $59.
8030 ▣ Typeset 1 *(7 Fonts)* . . . . . 59.
8032 ▣ Typeset 2 *(7 Fonts)* . . . . . 59.
8031 ▣ Typeset 3 *(6 Fonts)* . . . . . 119.
7928 ▣ Adobe Plus Pack . . . . . 119.
8367 ▣ ATM & Plus Pack Bundle . . . . . 169.
7406 ▣ Adobe Type Cart. 1 *(Display Faces)* 289.
7405 ▣ Adobe Type Cart. 2 *(Best Sellers)* . 289.
7392 ▣ Adobe PostScript Cartridge . . . . 289.
(Entire Adobe Type Library, from 1 to 164 is available. Call for more information.)

Aldus ... NCP
1332 □ PageMaker 3.01 . . . . . 499.

Alpha Software ... NCP
5104 ▣ Alpha Four 1.1 . . . . . 319.

Application Techniques ... NCP
1214 ▣ Pizazz Plus 2.0. . . . . 69.



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7384 ▣ Toolbook 1.0 for Windows . . . . . 309.

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Laser and Dot-Matrix Labels available, call with Avery Part Number.
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7336 ▣ Label Pro 1.0 for Dot Matrix . . . . . 49.

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8040 ▣ FaceLift for WordPerfect 5.0/5.1. . 59.
7569 □ Companion Value Pack . . . . . 125.
8883 ▣ Type City Cartridge with Deli . . . 259.
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1447 ▣ FormTool Gold 3.0 . . . . . 55.

Borland International ... NCP
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6242 ▣ Quattro Pro 2.0 . . . . . 339.
1514 ▣ Paradox 3.5. . . . . 529.

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1434 ▣ New Print Shop . . . . . 39.

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3950 ▣ Fastback Plus 2.1 . . . . . 119.

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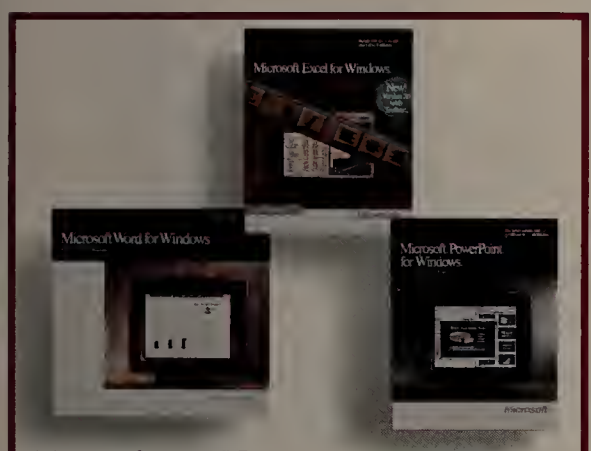

Microsoft ... NCP
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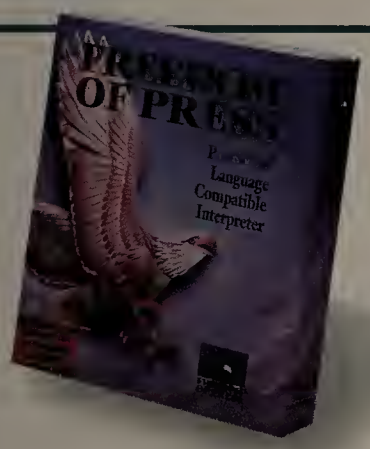

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7931 ☐ Random House Encyclopedia . . . 68.
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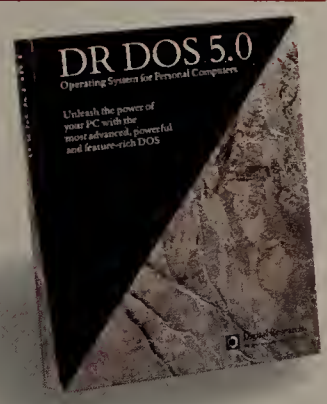

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3425 □Q&A 3.0 ..... 239.
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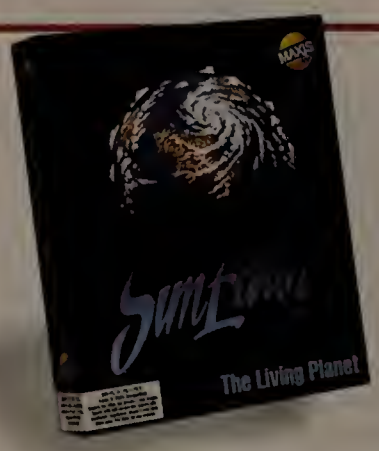

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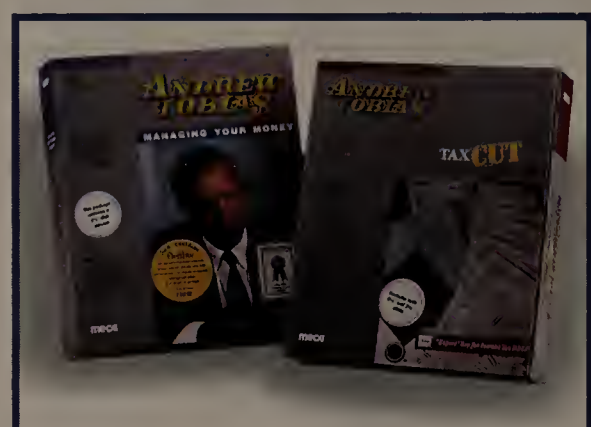

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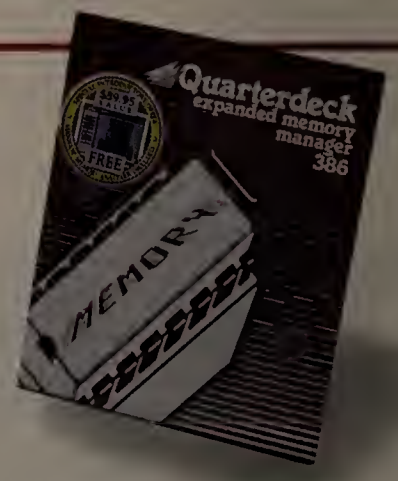

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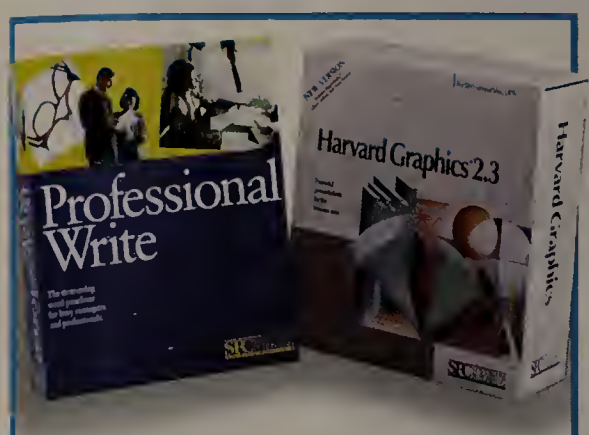

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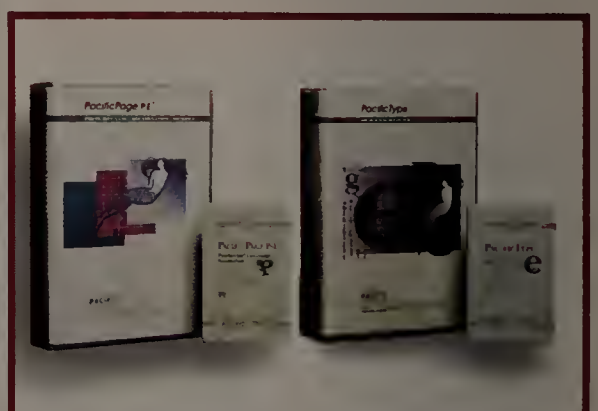

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ANDREW SHACHAT

WINDOWS TAMES THE WILD MAINFRAME

ERIC BENDER

Kingdoms rise and fall, small children grow up and have children of their own, but a corporation's mainframe applications just keep chugging away. And age is not improving their looks. They typically remain hard to learn, hard to use, and hard to integrate with PC applications. That means that most employees still can't get quick access to the business information on the mainframe—an increasingly vital resource in an ever-more-competitive marketplace.

Windows packages promise to turn this situation around by bringing the graphic environment's strengths—ease of use, consistency, memory management, and hot links between applications—to PC front ends for mainframe software. In

MAINFRAME APPLICATIONS AND DATA REMAIN LARGELY INACCESSIBLE TO MOST PC USERS, EVEN CORPORATE PROFESSIONALS. WHY? BECAUSE THAT'S THE WAY MAINFRAMES ARE—OR WERE. WINDOWS IS CHANGING THINGS.

the short run, the *Windows* offerings will aid data entry and other traditional terminal-emulation tasks. But in the long run, they should allow radical progress in bringing many more users closer to the data they need. They will solve what Wall Data founder John Wall calls the prototypical mainframe problem: how to get 40,000 people to use that interface.

EMULATING SUCCESS

Digital Communications Associates offered *Windowlink for IRMA*, the first *Windows* terminal-emulation package, back in 1987. Wall Data shipped *Rumba*, the first to handle multiple mainframe sessions, in fall 1989. But the real micro-to-mainframe stampede has followed on the heels of *Windows 3.0*, with products arriving from most major suppliers.

Like their DOS predecessors, these packages emulate various flavors of IBM 3270 terminals and support the bewildering list of necessary sidekicks: emulation and display modes, adapters, application interfaces, and other connectivity parameters. They support coaxial cable, modem, or local area network gateway links to the mainframe. They can capture mainframe screens or files and offer such bells and whistles as local printing, multiple emulation sessions, macros, remapped keyboards, and pop-up programmable keypads.

As *Windows* warriors, though, they can provide much more, beginning with the familiar pulldown menus, icons, and on-line help. *Windows 3.0*'s improved memory management lets you simultaneously juggle multiple mainframe sessions with other *Windows* programs. You can show each session in a window, with fonts that automatically resize along with the window.

Windows' data-sharing tricks also are more than handy. The ability to cut and paste is a big plus for culling mainframe data; you can copy and paste exactly what you want, rather than having to select one screen or file at a time.

BIG MACRO ATTACK

More dramatic are hot links that exploit Dynamic Data Exchange (DDE) connections. These, like other features in the *Windows* entries, can be driven by macro facilities built into packages like *Excel*, or *Windows* enhancers like Softbridge Microsystems' *Bridge*, or by custom development tools.

Say you want to retrieve documents from IBM's widespread but rather arcane Professional Office System (PROFS) electronic-mail system. "You can retrieve PROFS mail without ever seeing the mainframe," says Stephen Kangas, senior product manager at DCA. Within *Word for Windows*, for instance, you can run a macro that triggers a DCA *IRMA WorkStation for Windows* script and performs DDE transfers in the background.

DDE links also benefit financial analysts who need to tap corporate figures. "Before, they would bring up 3270 emulation, copy the numbers onto a slip of paper, and then off into *1-2-3* they would go," Wall says. "Now they can simply double-click on a spreadsheet and get the data."

FRIENDLIER FRONT ENDS

What will really make *Windows* sing the corporate mainframe song—and broaden the chorus of users—will be customized front ends that make it even simpler to get what you need without confronting raw mainframe data.

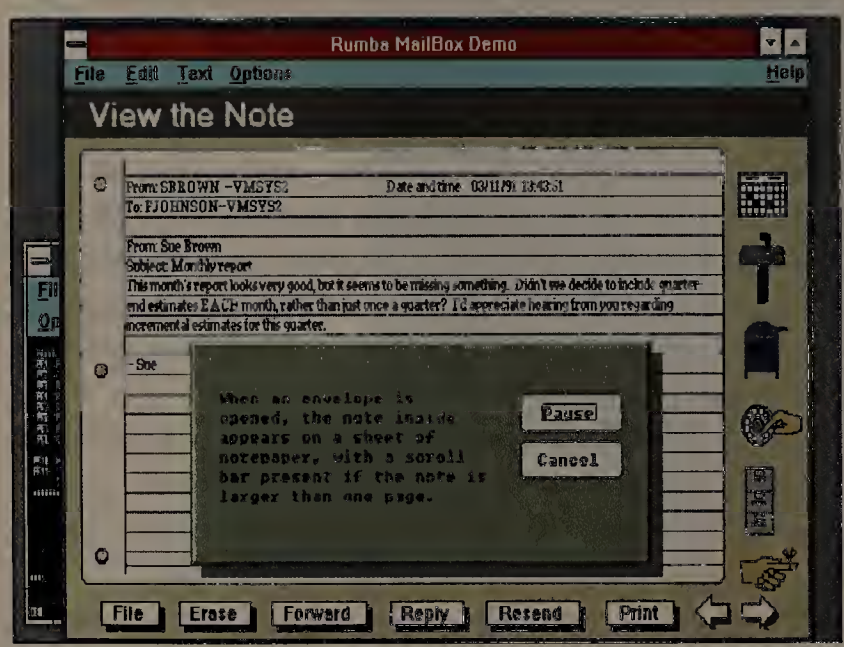
A new crop of object-oriented, visual-programming-oriented *Windows* tools released last year will help. Some of these, such as Asymetrix's *ToolBook*, are general-purpose programming tools. Others, such as Viewpoint's *I/F Builder* and Pilot Executive Software's *Lightship*, target the problem of accessing data on other machines. Both types can talk to various terminal-emulation packages (via *Windows* dynamic link libraries) to get the job done.

Anything hooked to a mission-critical resource like a mainframe will remain in the hands of information systems professionals rather than end users. However, these visually oriented tools can drastically simplify the professional's job. With *I/F Builder*, for instance, developers can build a front end by capturing the key mainframe screens, building associated templates that present the key data, creating log-on sequences, assembling an icon-driven interface, and linking all the pieces together. Such tools can drop development time to

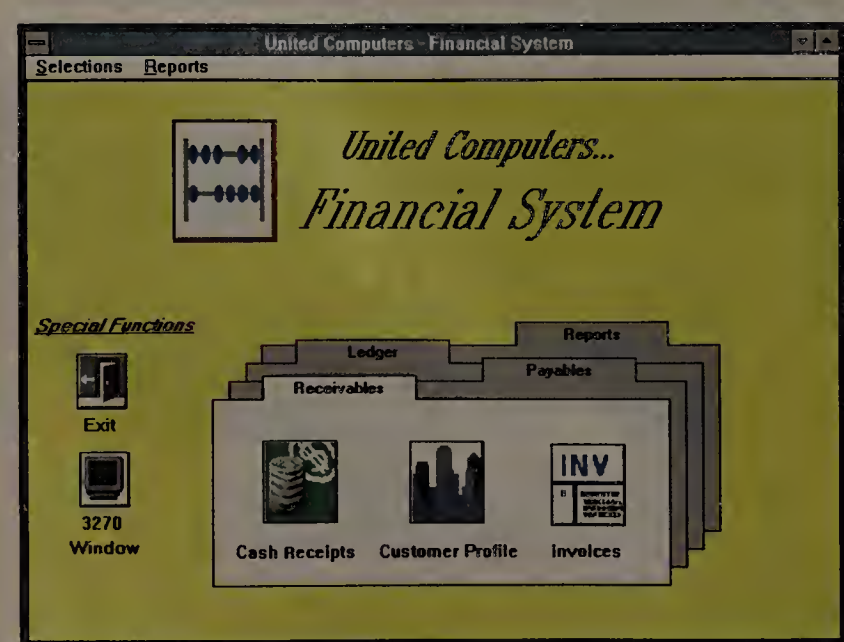
MATHEW McVAY

"WE NEED ACCESS TO THE MAINFRAME WITHOUT EXITING FROM WINDOWS," NOTES ROBERT FITZSIMMONS (LEFT) OF SEATTLE FIRST NATIONAL BANK.

MAINFRAME APPLICATIONS LIKE THE ONE IN THE MAIN WINDOW CAN BE DIFFICULT TO USE. RELAY GOLD AND ITS PEERS SIMPLIFY MAINFRAME ACCESS, ADDING STANDARD WINDOWS FACILITIES PLUS EXTRAS LIKE POP-UP PROGRAMMABLE KEYBOARDS.



WINDOWS PROGRAMS SUCH AS WALL DATA'S RUMBA ALLOW EASIER ACCESS TO GRIZZLED MAINFRAME PACKAGES LIKE IBM'S PROFS ELECTRONIC-MAIL SYSTEM.



VIEWPOINT'S I/F BUILDER LETS IN-HOUSE DEVELOPERS CREATE CUSTOMIZED FRONT ENDS SO USERS CAN SEE THEIR DATA WITHOUT GRAPPLING WITH UNFRIENDLY MAINFRAME APPLICATIONS.

as little as one-tenth of what conventional programs require, claims Viewpoint marketing vice president Tom Burt.

In the long run, as Burt notes, customers also want to take very expensive mainframe processing and shift it down to PCs. The *Windows* packages typically work with IBM's main high-level interface to existing mainframe packages. Some also support the advanced program-to-program interface geared for cooperative processing among computers large and small. However, customers are understandably wary about charging down these paths, because major rewrites of mainframe applications may take years rather than months and can bring a corporation to its knees if mishandled. "We have enough problems making our mainframe environment work without keeping track of what's happening on these desktops," one user notes wryly.

EARLY ADOPTERS: THE PAYOFFS

At Seattle First National Bank's capital markets division, "just about every PC user needs to get to the mainframe," notes product development officer Robert Fitzsimmons. About 20 traders and administrative staff are joined on a token ring net. The group will use *Extra* to call up electronic mail and handle transactions such as trade entries on the mainframe. "We need access to the mainframe without exiting from *Windows*, for productivity reasons," Fitzsimmons says. He is also investigating the benefits of pulling down mainframe data for manipulation in PC data bases.

General Electric Power Generation Services in Schenectady, New York, turned to *I/F Builder* to create a simple icon-based sign-on process, says programming manager Dale Smith. This was not difficult to do, he says. More ambitious is a resource-planning system that builds a two-way connection between a mainframe data base and a SQL data base on a PC or PC network. When rolled out early this year, this application will be available to GE customer service and engineering service managers at about 50 locations. GE could have built this application without *Windows*, Smith adds, but his users already are running *Windows* productivity applications.

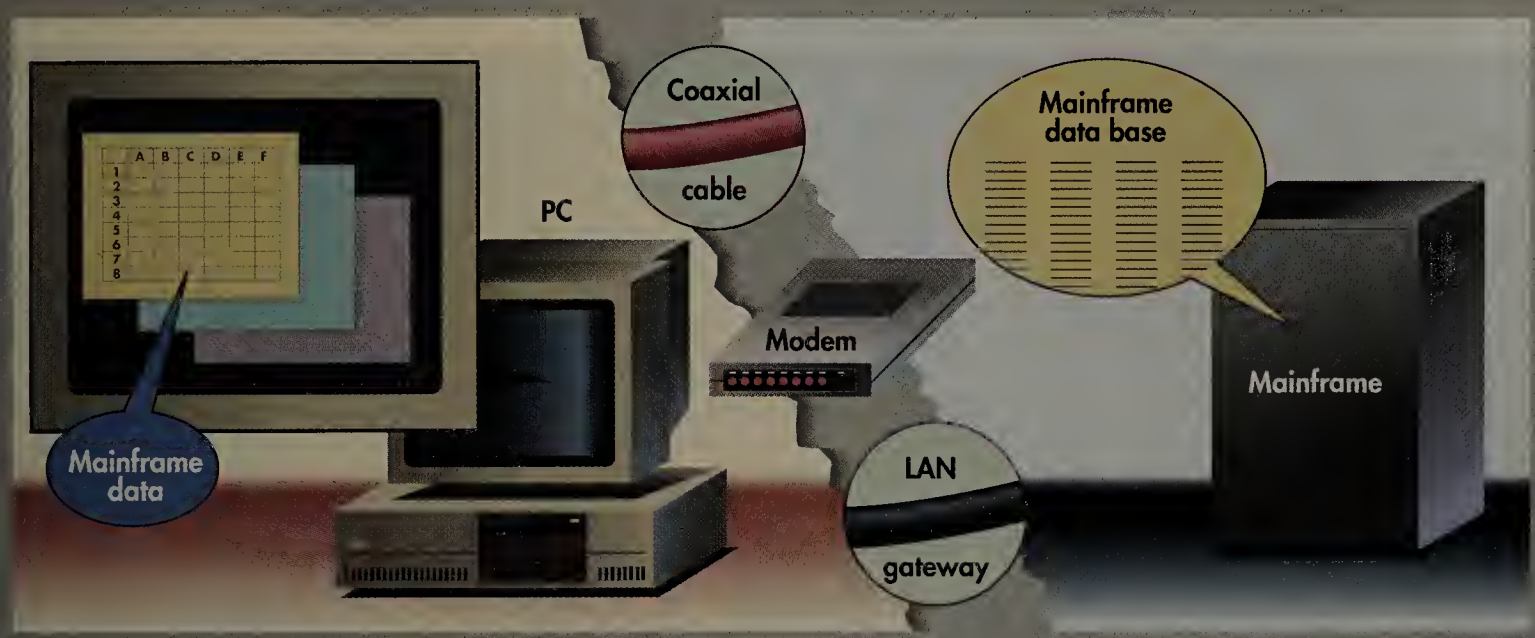
So are executives at Thorn EMI's North American headquarters in Boston, which is integrating data from its worldwide rental businesses, says project manager Tarlochan Ghataorhe. Thorn drew on *Lightship* for the PC network installation; "the technology is very easy to use," Ghataorhe says. DDE links have proved particularly helpful; even non-*Windows* DOS applications feed data into the system through Pioneer Software's *Q+E*.

BRINGING BACK BENEFITS

Windows micro-to-mainframe software runs on standard communications hardware and *Windows*-capable PCs. Increasingly, corporations make it part of a fully outfitted *Windows* PC. Some vendors have hiked software prices, but overall, users don't see acquisition costs as daunting.

MAKING THE WINDOWS CONNECTION

Windows communications packages and custom front ends will lower the barriers that separate corporate mainframe computers from most PC users. The Windows programs work with existing hardware, connecting to the big machines via coaxial cable, modems, or LAN gateway. They offer friendlier interfaces than DOS micro-to-mainframe packages and can automatically funnel data to other Windows applications using the DDE mechanism.



Customers have overcome early technical glitches, particularly at sites that connect PCs to the host through a local area network gateway (an increasingly popular approach). "*Windows* shows some signs of not dealing with a network environment very well yet," comments Seattle First's Fitzsimmons.

Additionally, performance is an issue on both PC and mainframe. On the PC, straight DOS emulators may be faster than *Windows* alternatives on simple jobs, although users downplay this problem and add that automating a multistep procedure with the new packages saves considerable time. Users are concerned, however, that customized front ends may run sluggishly. Fitzsimmons is intrigued by *ToolBook* but says the technology is not ready: "I'd be thrown out the window if I put something that slow on the desktop."

Minimizing connection time also is extremely important to corporate mainframe custodians, who must work to maximize use of their highly expensive machines. And calls from remote locations are daily dollars-and-cents concerns. Customers, however, consider these ongoing costs to be manageable.

In the long run, graphical views of mainframe data will help companies streamline their information flow—a crucial business objective. Doing this in DOS was always an uphill battle, says Wall. "But we're no longer bound by memory and a character-based environment. We can start presenting mainframe applications the same way as PC applications."

Eric Bender is PC World's *East Coast editor.*

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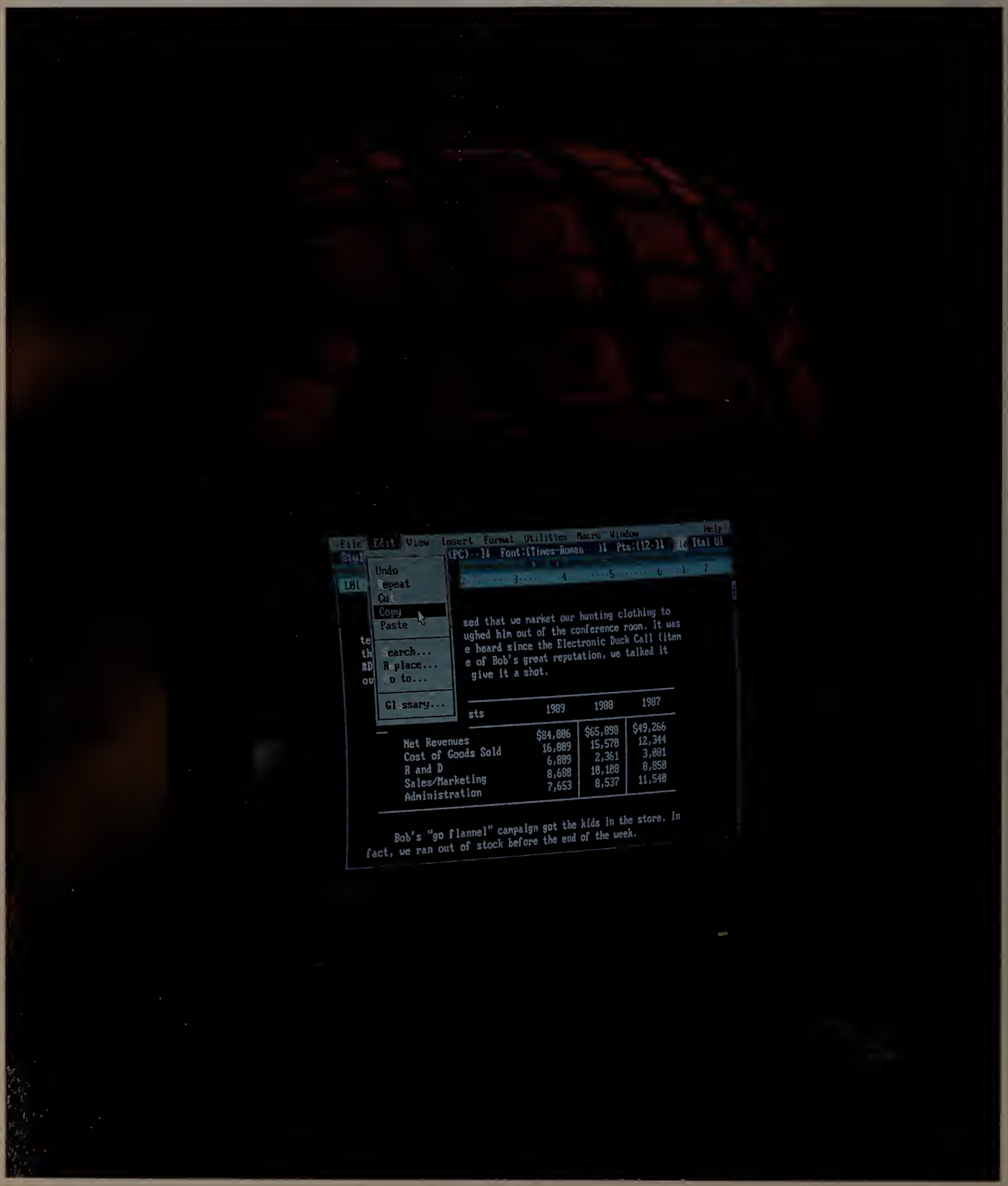
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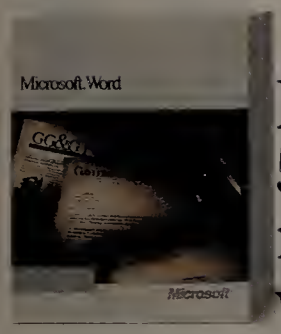
fact, we ran out of stock before the end of the week.

ason is over.



We created new Microsoft® Word version 5.5 with a certain aim in mind: make powerful word processing features easier for you to find and use.

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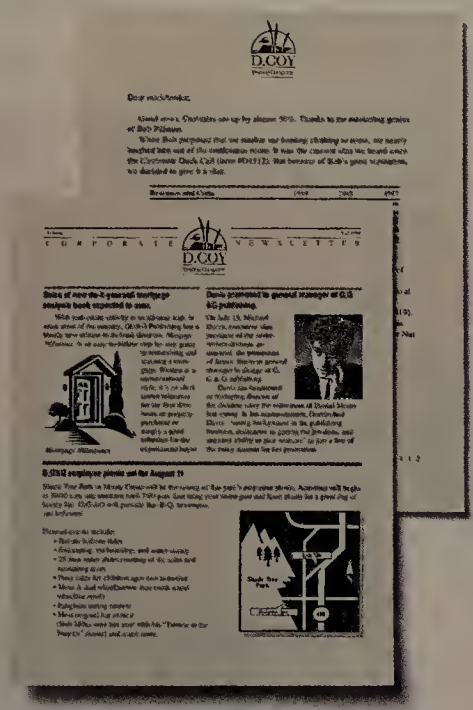

Easily and quickly create the most outstanding documents in your field.

And you can do it all with a point and click.

New Word 5.5 runs swiftly on virtually any PC. And because it features the emerging industry standard interface (CUA), you'll have no trouble transferring your skill to other leading applications.

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FAX BOARDS AND FAX GATEWAYS

Sick of sharing the fax machine? Single-user fax boards deliver better image quality, no waiting. But if your office is networked, a fax gateway can provide cost-effective service for the whole office.

SUSAN LUSTY

These days, nothing is certain but death and faxes. Fax machines have become almost as common as photocopiers—and you often have to wait in line just as long to use them.

But why wait? Instead of ordering yet another fax machine, you can buy a PC fax board and transmit facsimiles of your documents without leaving your desk. You'll save money as well as time—at $200 to $700 apiece, fax boards are cheaper. A similarly featured fax machine, which comes with a built-in scanner and printer, usually costs $1500 or more.

Besides convenience, a key advantage of PC fax is quality. Unlike fax machines, which must scan a document's pages before transmitting them, PC fax boards let you send files directly from your computer—resulting in crisper, cleaner text and graphics at the receiving end. You can print out incoming faxes on a plain-paper laser printer, producing far more readable output than what you can get from a typical fax machine's printer. Finally, there's confidentiality: Fax boards help keep sensitive communications safe from prying eyes.

If these boards are so hot, why are people still buying stand-alone machines? Mastering a PC fax system is more challenging than punching in a phone number and feeding paper to a fax machine. You have to install a board and software for each user, plus a dedicated phone line or a *fax-line switch*—a box that switches between voice and fax lines. You may also need a bigger hard disk, since faxes consume from 30K to 60K per page. And unless you have a scanner, you won't be able to send paper-based faxes.

Fax-hungry network users can minimize these problems by investing in a *fax gateway*—software that lets LAN users send and receive faxes via their workstations. A gateway usually requires a dedicated PC (an XT will do) equipped with one or more fax boards that are shared by everyone on the LAN. Using a gateway is cheaper and easier than installing a bunch of single-user boards. Another plus: Many gateways also let you use your existing E-mail system for easy faxing.

The following guide outlines key buying issues for the boards and gateway software listed in the tables. It's split into single-user and gateway sections, but because the software is so similar, many features are common to both.

Because all the products support the group III fax standard (98-by-198-dot-per-inch) and fine (198-by-198-dpi) resolutions, they can communicate with any fax machine on the planet. This guide lists only desktop PC boards that send and receive at up to 9600 bits per second (bps). While you can still buy send-only 4800-bps boards, the 9600-bps models are now cheap enough that the older boards are no longer a bargain. Finally, note that due to the lack of standardization among board vendors, most boards work only with the software that comes with them. Some gateway vendors, however, sell software that works with a number of third-party boards.

STEVE LYONS

FAX BOARDS

Fax boards are the best bet for nonnetworked users who don't need to send paper-based faxes. But don't throw away that fax machine—unless you want to invest in a scanner, you'll need it for transmitting paper forms and signed documents. In most cases, though, you can avoid the crush and transmit files from the comfort of your PC. Here's what to look for in a fax board.

Messaging Fax boards give you far more messaging power

FAX GATEWAYS—THE NETWORK FAX SOLUTION

Manufacturer	Product	List price	Supports Windows 3.0	CAS compatible	Boards supported in PC	Max. no. of boards per PC
		STANDARD FEATURES				
ALCOM	LanFax Redirectar LanFax Gateway	$795[1] $795[1]	[2] N	Y Y	any CAS baard [3]	4 8
AMERICAN DATA TECHNOLOGY	SmartFaxnet	$1295	N	N	SmartFaxPlus	[5]
CALCULUS	EZ-FaxLAN ESS EZ-FaxLAN ESL	$399[1] $749	Y Y	N N	Calculus EZ-Fax Calculus EZ-Fax	1 1
CASTELLE	FaxPress	$3995	[2]	N	[6]	0
CC:MAIL	cc:Fax	$1995	Y	Y	any CAS baard	4
COKER ELECTRONICS	tPast Faxfarward for LAN	$644[1]	Y	N	The Camplete Fax/9600	1
THE COMPLETE PC	The Camplete Fax/Gateway	$1399[7]	N	N	The Camplete Fax/9600	1
CONSUMERS SOFTWARE	Netwark Caurier ta Fax Gateway	$2500	Y	Y	Intel Cannectian CaPracessar and SatisFaxtian baards	2
COPIA INT'L	FaxFacts	$1250	N	N	JT Fax 9600, Intel, and Braaktrout	8
CRACCHIOLO & FEDER	RightFax	$1495	Y	N	Braaktraut TR-112 and TR-111MC	8
DATA RACE	Actian PC Fax/Madem	$695	N	N	DataRace PC Fax/Madem	1
ENABLE SOFTWARE/HIGGINS GROUP	Higgins Ta: Fax	$995	Y	Y	Intel Cannectian CaPracessar	1
THE FAX GROUP	FaxPra III	$1999	Y	Y	FaxPra Series	[5]
GAMMALINK	GammaNet	$1195	Y	Y	GammaFax XP, CP, and CPD baards	16
IMAVOX	TurbaFax-NET	$995	Y	N	TurbaFax	1
KRIS TECHNOLOGIES	PraFax II LAN	$1699[7]	N	N	PraFax II	1
MURATA BUSINESS SYSTEMS	PCF9/FIP	$2995	N	N	[6]	0
OAZ COMMUNICATIONS	NetFax Manager	$2795[7]	Y	N	OAZ	4
OPTUS SOFTWARE	FACSys	$995	Y	Y	Intel, GammaFax	[5]
PACIFIC IMAGE COMMUNICATIONS	SuperFax	$995	Y	N	SuperFax	8
PUREDATA	PureFax	$1495[7]	Y	Y	PureFax	1
SOFNET	XChange ShareFax	$795	Y	Y	any CAS board ar Hayes JT fax baard	1

[1]Base price. Cast varies depending an number of users.
[2]Extra-cast aptian.
[3]Supports Intel Cannection CaPracessar and SatisFaxtian boards; GammaLink; Braaktraut TR-112; The Camplete Fax/9600.
[4]Uses Direct-Inward Dialing.
[5]Limited anly by number of available slats.
[6]Stand-alane fax server unit; requires na baards.
[7]Cast includes saftware plus bundled fax baard.

than similarly priced fax machines. All the boards listed can receive faxes automatically and schedule transmissions for low-cost late-night delivery. All provide phone book–style directories for storing frequently called numbers, and all let you broadcast the same fax to more than one destination. Most also keep a *log,* or a record, of each fax session and can print faxes as they arrive.

If you're a frequent faxer, you'll need a fax board that can run efficiently in the background while you're working in another application. Some users may want a board that will automatically *poll,* or call up, other fax systems and download waiting faxes (and vice versa).

Most of the boards include a built-in Hayes-compatible 1200- or 2400-bps modem, but you'll need to buy the communications software separately. Many also transfer binary files at 9600 bps, provided the same brand of fax board is on the other end.

File Preparation Any fax board worth a dime can convert ASCII text to group III fax format, and many convert popular graphics and word processing file formats. To convert these files, you may have to exit your application and load the fax software, and the document's fonts are often converted to a single size of Courier.

Fortunately, most boards also come with printer redirection utilities that let you send high-quality faxes from inside an application. Using memory-resident pop-ups or special printer drivers, you simply "print" Epson, LaserJet, or PostScript output to fax format from within your application. However, while the document retains its fonts and graphics, it's still limited to

STEVE LYONS

										PRINTER REDIRECTION UTILITIES			FILE CONVERSION				
Modem goteway option	MHS E-moil option	Delete fox from queue	Routes incoming foxes	Auto-motic polling	Auto-motic printing	Text editor	Grophics (bit-mop) editor	Screen-copture utility	Sconner utility	Epson	HP LoserJet	Post-Script	PCX	TIFF	Word-Perfect	Worronty	Reoder service number
N	N	N	N	N	Y	Y	N	N	N	Y	N	N	Y	N	Y	1 year	713
N	Y	Y	Y[4]	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	N	1 year	713
N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y	Y	N	1 year	714
N	Y	Y	N	Y	Y	N	N	Y	Y	Y	Y	N	Y	N	Y	1 year	715
N	Y	Y	N	Y	Y	N	N	Y	Y	Y	Y	N	Y	N	Y	1 year	715
N	Y	Y	[2]	N	Y	N	N	Y	N	N	Y	Y	Y	N	Y	1 year	716
Y	Y	Y	N	Y	N	Y	Y	Y	N	N	N	Y	N	N	N	90 days	717
Y	Y	Y	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	30 days	718
N	N	N	N	Y	Y	Y	N	N	N	N	N	N	Y	N	N	5 years	719
Y	N	N	N	Y	Y	Y	N	Y	N	Y	Y	Y	Y	N	N	30 days	720
N	N	N	Y[4]	N	N	N	N	N	N	N	N	N	Y	Y	N	6 months	721
N	N	Y	Y[4]	[8]	Y	Y	N	Y	Y	Y	Y	N	Y	N	N	90 days	722
N	N	Y	N	N	N	N	N	N	N	Y	Y	N	Y	Y	N	2 years	723
Y	Y	N	N	N	N	[9]	N	N	N	N	N	N	Y	N	N	90 days	724
Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	3 years	725
N	N	Y	Y[10]	Y	Y	Y	N	Y	Y	Y	[2]	[2]	Y	Y	Y	1 year	726
N	Y	Y	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	1 year	727
N	N	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	2 years	728
N	N	Y	Y	Y	Y	Y	N	N	Y	N	Y	Y	Y	Y	N	90 days	729
N	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y	Y	1 year	730
N	Y	Y	Y	Y	Y	N	N	Y	Y	N	Y	N	Y	N	N	90 days	731
N	N	N	N	N	Y	N	N	Y	Y	Y	Y	Y	N	Y	N	90 days	732
Y	N	Y	N	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	1 year	733
N	N	Y	N	Y	N	Y	N	N	N	N	N	N	Y	N	N	30 days	734

[8]In OS/2 version only.
[9]E-mail system provides text editor.
[10]Requires GammaFax CPD or CP board with DFX daughtercard.

For more information about all products in this table, circle reader service no. 906.

group III resolution.

If any of your applications support Intel's Communicating Applications Specification (CAS) protocol, look for a board that does likewise. With CAS, you can send faxes directly from inside CAS-compatible programs (such as *WordPerfect*) without having to load a utility or switch printer drivers. Finally, if you own a scanner, look for fax software that can operate one—so you won't have to exit the program to scan in a document—plus a bit-map editor for cleaning up scanned files.

FAX GATEWAYS

For network users, a fax gateway system is the most cost-effective way to go. And if you need to send paper-based faxes as well as disk files, it's a lot easier to justify spending $800 or more on a scanner when will it serve a LAN-ful of users. While most of the buying issues for single-user boards apply to gateways as well, you should also consider capacity, compatibility, and fax routing.

Capacity Most gateway software lets you gang multiple boards in a single file or print server, but to avoid the risk of data loss, it's better to use a dedicated PC. The maximum number of boards you can install varies; the more boards you have, the fewer delays you'll encounter on busy networks. (Note: Castelle and Murata combine gateway software with stand-alone boxes that don't require a dedicated PC or fax boards.)

Some products offer optional modem gateways, which allow users to access a dedicated LAN modem via the gateway software—a money-saving way to share network communications resources.

Compatibility While most vendors sell their own boards

FAX BOARDS—GETTING THE FAX STRAIGHT TO YOUR PC

		STANDARD FEATURES					
Manufacturer	Product	List price	Supports Windows 3.0	CAS compatible	Built-in Hayes-compatible modem	Background transmissions	Automatic polling
AMERICAN DATA TECHNOLOGY	Smart Fax II	$299	N	N	Y	Y	Y
	Smart Fax Plus II	$799	N	N	Y	Y	Y
BROOKTROUT TECHNOLOGY	Fax-Mail 96	$499	N	N	N	Y	Y
CALCULUS	EZ-Fax96	$299	Y	N	N	Y	Y
	EZ-Faxit	$299	Y	N	N	Y	Y
CHOICE TECHNOLOGY GROUP	DeskFax Professional	$429	N	Y	N	Y	N
	DeskFax Preferred	$289	N	Y	N	Y	N
THE COMPLETE PC	The Complete Fax/9600	$499	Y	N	Y	Y	Y
	The Complete Communicator	$699	Y	N	Y	Y	Y
DATA RACE	Action PC Fax/Modem	$695	N	N	Y	Y	N
DFI	FaxModem-200	$249	N	N	Y	[1]	N
EVEREX SYSTEMS	Carrier 24/96	$499	N	N	Y	N	Y
	EverFax 24/96	$399[2]	N	N	Y	Y	Y
THE FAX GROUP	FaxPro I	$199	[3]	Y	N	N	Y
	FaxPro II	$399	Y	Y	Y	Y	Y
	Combi	$1499	Y	N	Y	Y	Y
FREMONT COMMUNICATIONS	Fax96	$195	N	N	N	[1]	N
	Fax96 1-Liner	$295	N	N	N	[1]	N
GAMMALINK	GammaFax CP	$995	N	Y	N	Y	Y
	GammaFax XP	$595	N	Y	N	Y	Y
GREY MATTER RESPONSE	Communique Fax 9600	$249	N	N	N	Y	Y
HAYES MICROCOMPUTER PRODUCTS	JT Fax 9600B	$499	N	N	Y	Y	N
HOLMES MICROSYSTEMS	PC-Fax'em	$299	Y	N	Y	Y	Y
IMAVOX	TurboFax	$395	N	N	N	Y	Y
INTEL PCED	SatisFaxtion	$499	Y	Y	Y	Y	Y
KRIS TECHNOLOGIES	ProFax II	$695	N	N	N	Y	Y
MACRONIX	MaxFax 9624 LT-C	$599	[3]	N	Y	Y	N
	MaxLite/PC	$499	[3]	N	Y	Y	N
	MaxFax II	$449	[3]	N	Y	Y	N
MICRO EXPRESS	Micro Express ATFax 9600	$249	N	N	N	Y	Y
OMNITEL	Pocket Fax/Data Modem	$399	N	N	Y	Y	Y
	2496i+	$379	N	N	Y	Y	Y
	2496s+	$399	N	N	Y	Y	Y
OSMOS	Complus FM 9624i	$250	[3]	N	Y	Y	N
PACIFIC IMAGE COMMUNICATIONS	SuperFax	$750	Y	N	N	Y	N
PRODEM TECHNOLOGY AMERICA	PDMFax+	$250	Y	Y	N	Y	Y
PUREDATA	PureFax PDI 9624	$599	Y	Y	Y	N	Y
TOUCHBASE SYSTEMS	WorldPort 2496	$699	N	N	Y	Y	N
XECOM	NewPort PC Fax/Data	$399	N	N	Y	Y	N
ZOLTRIX	ZoFax 96/24	$169	Y	N	Y	Y	Y
ZOOM TELEPHONICS	Zoom/FaxModem FX9624	$199	N	N	Y	Y	Y
	Zoom/FaxModem FC9624	$199	N	N	Y	Y	Y

[1]Receive only. [2]Internal board $399; external fax unit $499. [3]Extra-cost option.

STEVE LYONS

for use with the gateway software, some gateways can also use third-party boards. Make sure your gateway supports the ones you choose. LAN compatibility is also crucial—all the gateways support Novell NetWare and 3Com ethernet LANs, but support for other networks varies.

Many LAN E-mail vendors let you send and receive faxes via their own gateway products. Others let you send faxes from within your E-mail system using another gateway, provided that both packages support Novell's Message Handling Service (MHS) standard. While both methods enable you to use your familiar E-mail interface for handling faxes, you usually have to forgo such sophisticated features as

					PRINTER REDIRECTION UTILITIES			FILE CONVERSION				
Automatic printing	Text editor	Graphics (bit-map) editor	Screen-capture utility	Scanner utility	Epson	HP LaserJet	Post-Script	PCX	TIFF	Word-Perfect	Warranty	Reader service number
Y	N	Y	Y	Y	Y	Y	N	Y	Y	N	1 year	685
Y	N	Y	Y	Y	Y	Y	N	Y	Y	N	1 year	685
Y	Y	N	N	Y	Y	N	N	Y	Y	N	1 year	686
Y	N	N	Y	Y	Y	Y	N	Y	N	Y	1 year	687
Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	1 year	687
Y	N	N	Y	N	Y	Y	N	Y	Y	Y	1 year	688
Y	N	N	Y	N	Y	Y	N	Y	Y	Y	1 year	688
Y	Y	N	N	Y	Y	N	N	Y	N	N	5 years	689
Y	Y	N	N	Y	Y	N	N	Y	N	N	5 years	689
N	N	N	N	N	Y	Y	N	Y	Y	N	2 years	690
Y	Y	N	Y	N	Y	Y	N	Y	Y	N	1 year	691
N	N	N	N	Y	N	N	N	Y	Y	N	2 years	692
N	N	N	N	Y	Y	N	N	Y	Y	N	2 years	692
Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	3 years	693
Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	3 years	693
Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	3 years	693
N	Y	N	N	Y	Y	Y	N	Y	Y	[3]	2 years[4]	694
N	Y	N	N	Y	Y	Y	N	Y	Y	[3]	2 years[4]	694
N	N	N	N	Y	Y	[3]	[3]	Y	Y	Y	3 years	695
N	N	N	N	Y	Y	[3]	[3]	Y	Y	Y	3 years	695
N	Y	N	N	N	N	N	N	Y	Y	N	1 year	696
Y	N	Y	Y	Y	Y	N	N	Y	N	N	2 years	697
Y	Y	N	N	N	N	N	N	Y	Y	N	5 years	698
Y	Y	Y	N	Y	N	N	N	Y	Y	Y	1 year	699
Y	N	N	N	[3]	Y	N	N	Y	N	N	5 years	700
Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	1 year	701
N	Y	N	Y	Y	Y	Y	N	Y	Y	Y	5 years	702
N	Y	N	Y	Y	Y	Y	N	Y	Y	Y	5 years	702
N	Y	N	Y	Y	Y	Y	N	Y	Y	Y	5 years	702
N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	2 years	703
Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	2 years	704
Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	2 years	704
Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	2 years	704
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	2 years	705
Y	N	N	Y	Y	Y	Y	Y	N	Y	N	90 days	706
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	2 years	707
N	Y	Y	Y	N	Y	Y	N	Y	Y	Y	1 year	708
N	Y	N	N	N	Y	N	N	Y	N	N	2 years	709
Y	Y	N	Y	N	Y	Y	N	Y	Y	Y	2 years	710
Y	Y	[3]	Y	N	Y	Y	Y	Y	Y	Y	1 year	711
Y	Y	N	N	N	Y	N	N	Y	Y	Y	7 years	712
Y	Y	N	N	N	Y	N	N	Y	Y	Y	7 years	712

[4]Two years or 24,000 faxes, whichever comes first.

For more information about all products in this table, circle reader service no. 905.

background and scheduled transmissions.

Routing All the packages notify you when a fax is sent, and most let you view the fax queue and delete outgoing faxes. Receiving faxes is trickier. Most gateways require a human administrator to route incoming faxes, which can cause delays. Fortunately, there are alternatives.

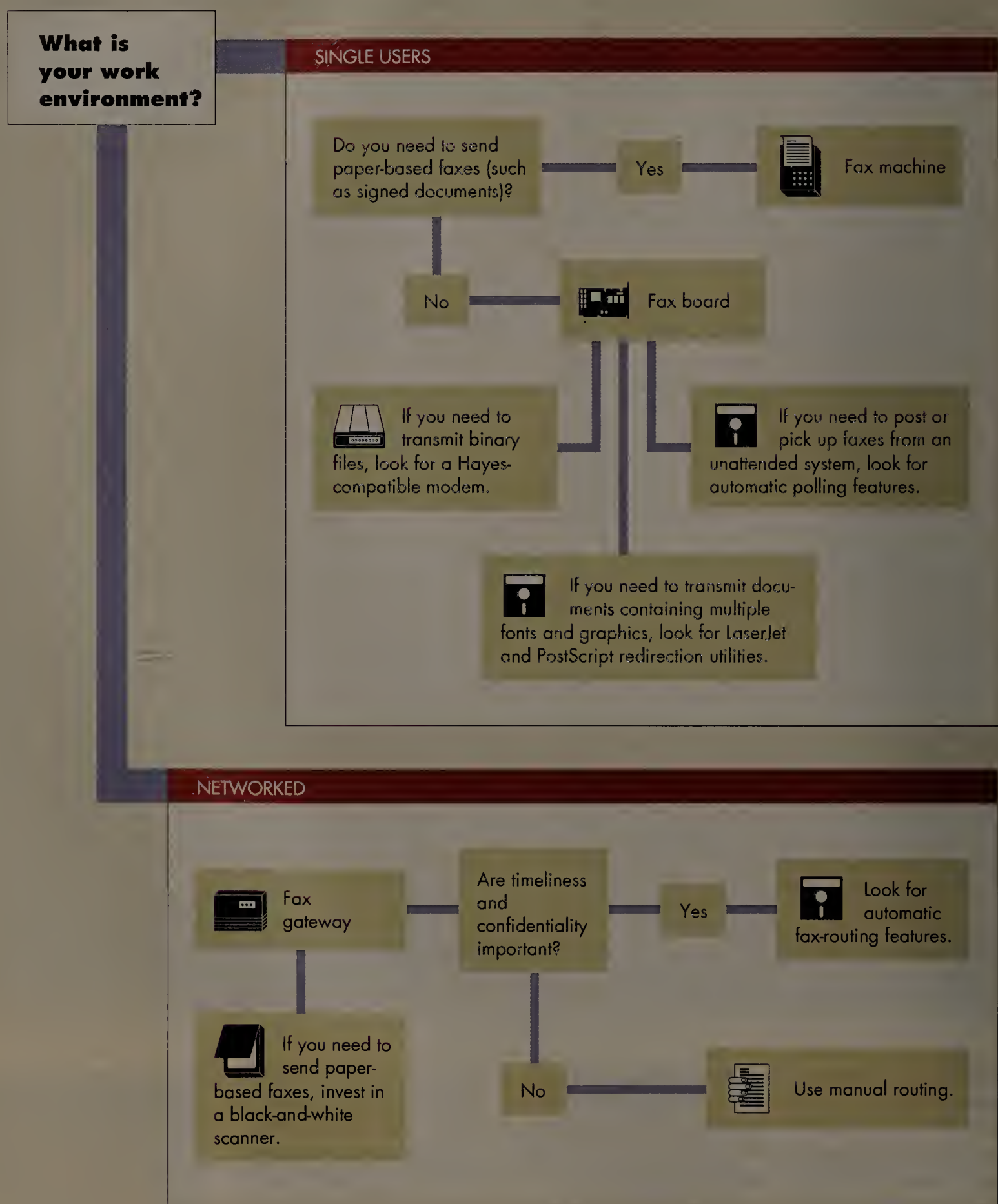
If you're willing to pay, you might consider a gateway that supports Direct-Inward Dialing (DID). This phone company service lets your gateway imitate a PBX switchboard, routing incoming faxes directly to each user. However, DID requires a dedicated fax line for each user, and DID lines are more expensive than normal phone lines.

Several vendors offer a more complicated but cheaper option, whereby fax senders punch in a special four-digit code for each recipient, and the gateway routes the incoming fax to the proper individu-

KNOW YOUR OPTIONS

What's Your Fax Profile?

If your office is networked, a fax gateway—a combination of fax board and special software—can provide fax capability for the whole work group at a low cost.



als. The Fax Group's approach is more unusual: Faxers fill in the user ID number on a special cover sheet; the gateway scans the number and directs the fax accordingly.

LIFE IN THE FAX LANE

Buying yet another fax machine is not the solution to your faxing dilemmas. A single-user fax board or, even better, a LAN fax gateway makes a lot more sense. Ideally, sending and receiving faxes should be as simple as printing a document or sending E-mail. After all, you've got better things to do than wait in line for faxes.

Susan Lusty is an assistant editor for PC World.

WHERE TO BUY

Alcom Corp.
2464 Embarcadero Way
Palo Alto, CA 94303
415/493-3800,
415/493-6185 (fax)

American Data Technology
44 W. Bellevue Dr. #6
Pasadena, CA 91105
818/578-1339,
818/578-1264 (fax)

Brooktrout Technology Inc.
144 Gould St.
Needham, MA 02192
617/449-4100,
617/449-9009 (fax)

Calculus Inc.
522 Mercury Dr.
Sunnyvale, CA 94086
408/733-7800,
408/733-8594 (fax)

Castelle
3255-3 Scott Blvd.
Santa Clara, CA 95051
800/359-7654,
408/496-0502 (fax)

cc:Mail Inc.
2141 Landings Dr.
Mountain View, CA 94043
800/448-2500,
415/961-8400 (fax)

Choice Technology Group, Ltd.
11545 W. Bernardo Ct. #200
San Diego, CA 92127
800/767-7656,
619/485-0561 (fax)

Coker Electronics
1430 Lexington Ave.
San Mateo, CA 94402
415/573-5515

The Complete PC
1983 Concourse Dr.
San Jose, CA 95131
800/634-5558,
408/434-1048 (fax)

Consumers Software Inc.
73 Water St.
Vancouver, B.C.
V6B 1A1 Canada
800/663-8935,
604/682-1378 (fax)

Copia Int'l, Ltd.
1964 Richton Dr.
Wheaton, IL 60187
708/682-8898,
708/665-9841 (fax)

Cracchiolo & Feder, Inc.
4400 E. Broadway #600
Tucson, AZ 85711
602/327-1357,
602/321-7450 (fax)

Data Race
11550 IH-10 W #395
San Antonio, TX 78230
512/558-1900,
512/558-1929 (fax)

DFI
2544 Port St.
W. Sacramento, CA 95691
916/373-1234,
916/373-0221 (fax)

Enable Software/ Higgins Group
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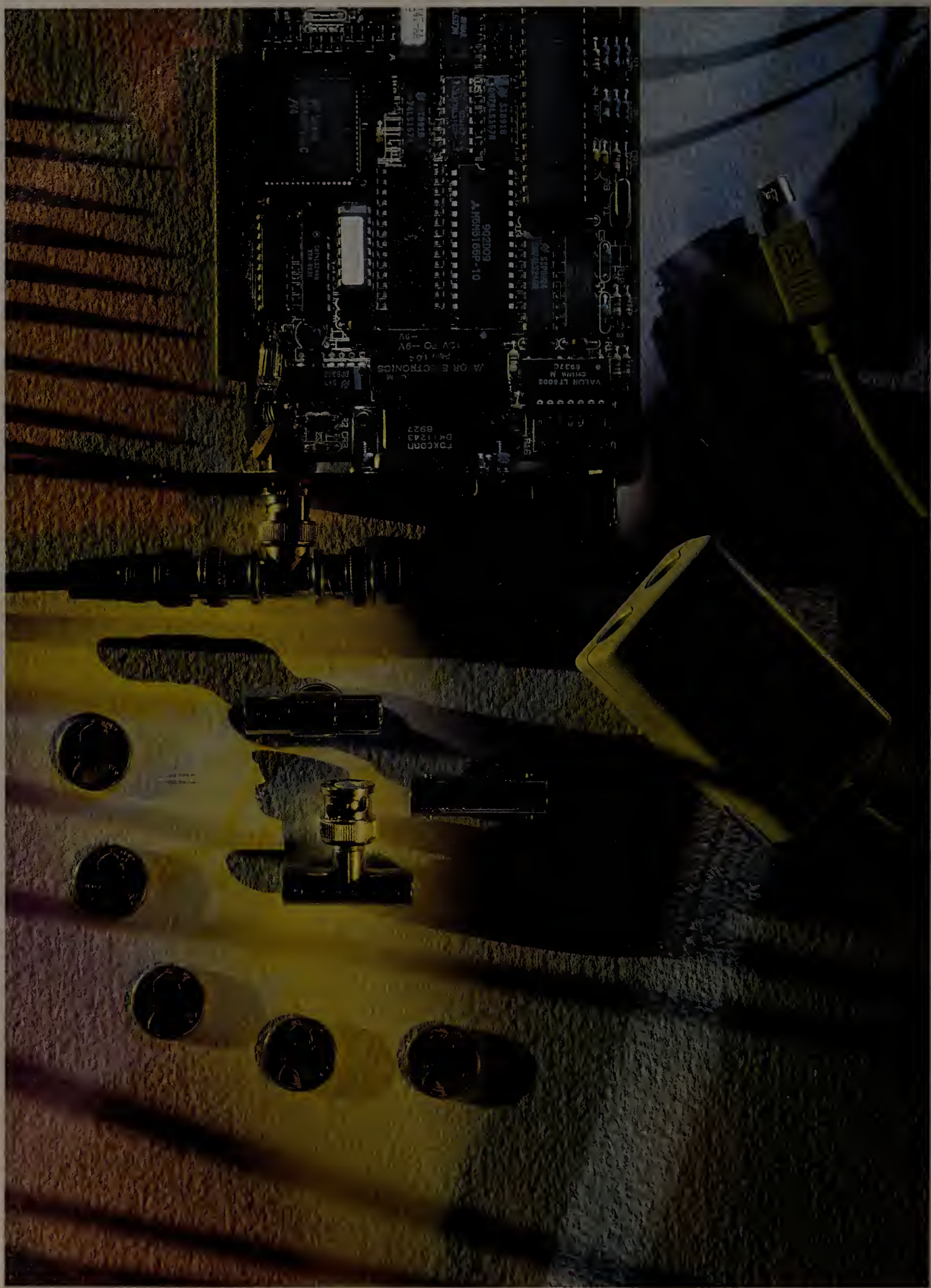

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Five Ways NETWORKS Pay Off

LANs still take lots of money and patience to set up, but the benefits can transform your business. Five companies share their LAN frustrations, successes, and advice.

Ask most people what they think of local area networks, and you'll get an earful—you'll hear about the time the server crashed just before they saved their files, or about the multiuser data base application that had so many bugs it was unusable for months. Even such straightforward tasks as printing a report with a couple of fonts can become a major undertaking when a network is involved.

But despite the headaches, organizations of all sizes are installing networks at an amazing rate, anticipating enormous payoffs. Some firms are looking to PC LANs as flexible and cost-efficient alternatives to minicomputers and terminals, while others simply want to provide employees with a convenient way to exchange messages and data with co-workers.

To get a snapshot of how organizations of all sizes are putting networks to work, *PC World* interviewed consultants, vendors, users, and analysts about networking in the 1990s. What we found were some shining examples of successful network implementation—organizations that despite sometimes unrealistic expectations early on have derived substantial benefits from their LANs.

SHARON FISHER

KATHERINE LAMBERT

Pam Shepard used to spend hours typing airbills. Now a custom data base handles the job.

PROBLEM: Secretaries at Sutherland Asbill & Brennan had to type dozens of overnight airbill forms manually each day, and the firm was looking for a way to automate the process.

SOLUTION: A Clipper data base application lets users easily prepare mailings using on-screen forms and dedicated print servers.

BENEFITS: Not having to type airbill forms saves hundreds of hours of clerical time; provides detailed records of all mailed documents.

These profiles of five organizations illustrate some truisms of networking. Although each company installed its PC LAN to solve a specific business problem, the number and variety of applications has grown as users and management alike have grown more confident of the technology. And while some of the applications are custom-tailored solutions, such as Sutherland Asbill & Brennan's overnight airbill application or Boeing's use of the "org chart" metaphor to access data across the organization, each company uses its LAN to solve everyday problems facing businesses of all sizes: providing more streamlined access to data; automation of manual tasks; and finally, although perhaps most important, improved communication with co-workers and customers—regardless of their location.

1. Automating Routine Tasks

Sometimes solving the tiny but irritating and time-consuming problems can be more satisfying than resolving larger ones.

At Sutherland Asbill & Brennan in Washington, D.C., the sticky problem was getting critical legal documents sent out quickly and with a minimum of disruption of other support staff duties. These documents "need to get in the hands of individuals quickly. [They] need to be an exact copy of something filed before the court, and everyone participating has to receive a copy," says Don Ramsey, information systems coordinator for the 135-attorney law firm.

Needless to say, the company is a major customer of express-mail overnight services. A secretary at the firm might need to send a document to as many as 80 people one day, then turn around and send another set of documents to the same 80 people the next.

Sounds like a job for a data base and a printer. But the multipart carbon forms used by express mail services can't be filled out by the laser printers that the firm used almost exclusively. Every time there was an overnight package to go out, a secretary had to type and proofread the names and addresses, knowing that the same job might have to be done again the next day.

It wasn't a trivial task. "It takes only two or three minutes to type a form, but when you're talking about sending a mailing to a hundred people, that's a lot," says legal secretary Pam Shepard.

That problem wasn't the reason Sutherland Asbill & Brennan installed its network in 1988—the firm was looking to automate its word processing and chose a LAN for its efficiency, flexibility, and cost savings over a minicomputer. But automating the airbill process turned out to be one of the first projects undertaken on the net, and the solution was an application that's now one of the most widely used, says Ramsey.

The application itself is beautifully simple, written for the firm by WBS & Associates, a consulting company in Annandale, Virginia. "It's essentially a *Clipper* data base with some C interfaces thrown in," explains Ramsey. "The basic stuff was done in just a few weeks."

Users create data bases of names and addresses, then pick names from a list any time they need to send out airbills. With an on-screen form, a user can also request Saturday delivery and indicate to which account the charges are to be billed; the program automatically generates the proper date. Users specify on which printer the airbills should be generated and can call up a complete cus-

tomer record at any time.

One server on the company's 360-node network is dedicated to running the application. There's a print server on every floor equipped with a dot matrix printer and preloaded airbill forms. Every few minutes, the airbill application server polls the nine network file servers to see if any airbills need to be printed. It then routes the job to the print server specified by the user. If the printer jams, the job is held in a queue, and the user can resubmit it from the print server by pressing a single key.

While you couldn't say that the airbill application has paid for Sutherland Asbill & Brennan's network, it's easily one of the most valued and cost-efficient uses of the LAN. Using the network to automate preparing airbills has saved the firm "hundreds of hours of clerical time," says Tina Derecola, manager of information systems.

2. Group Data Analysis

For most of Craver, Mathews, Smith & Company/West's clients, direct mail is the only way they can get the word out to the public, says Stephen King, manager of fund-raising support services for the Larkspur, California, firm.

The eight-year-old company's clients include several public television stations, as well as environmental organizations such as the Sierra Club and Greenpeace. Few people enjoy getting deluged with membership and donation requests, but such direct-mail pieces are the main source of revenue for most not-for-profit organizations, King says.

As King is quick to note, when your clients' livelihood depends on the success of their direct-mail campaigns, you need a foolproof way of maintaining lists and analyzing the effectiveness of the mail—all 80 to 100 million pieces produced annually.

Enter the firm's 45-workstation NetWare LAN.

The company installed its network three years ago, hooking together the dozen or so PCs in the office at that time. Before the network was installed, most analysis of mailings and responses was ad hoc. For the most part, each staff member kept his or her own data base, which prevented detailed cross-campaign analysis.

Information on client mailings is now stored in a series of *1-2-3* spreadsheets and *R:base* data bases (maintained by data entry staff), which are located on a central server and accessible to everyone on the network. In all, the firm has detailed records on about 100,000 lists or group mailings, representing about 250 million pieces of mail.

"We keep information on what we mailed and what the response was, and by putting those two pieces of information together, we can plan for the future," says King.

In one campaign, for example, the firm might send out 100,000 pieces of mail for the Sierra Club using a list of Greenpeace members. "We would then track how much money it brought in, how many people responded, and how much [the mailing] cost us," he explains. "Then we could determine if we wanted to mail more, or less, the next month." Sharing the data enables the firm to analyze clients' lists and determine which type of mailing and which potential donors will generate the best results for a particular campaign.

Before a new mailing is sent out, the

ANDY FREEBERG

Installing a LAN improved the firm's ability to analyze client mailings, says Stephen King.

PROBLEM: Craver, Mathews, Smith & Company/West needed a way to maintain mailing lists and analyze the effectiveness of 80 to 100 million pieces of mail annually.

SOLUTION: A 45-workstation NetWare LAN with an R:base data base and 1-2-3 worksheets stored on a central server.

BENEFITS: The ability to track responses by a variety of variables; the ability to share complex 1-2-3 formulas for analyzing data.

DAVID SMART

It took Rick Manning two weekends to install Pine Bluff Warehouse's E-mail system.

PROBLEM: Pine Bluff Warehouse Company needed to provide customers with up-to-the-minute information on shipment and delivery of goods.

SOLUTION: An EDI link between Pine Bluff and its major steel customers provides real-time access to inventory and shipment information.

BENEFITS: Pine Bluff now receives timely notification of all deliveries; customers get almost instantaneous access to key billing information and can maintain inventory to fit customer demand; improved communication between Pine Bluff and its customers.

list is divided into groups, each of which is coded for later analysis. A large mailing, for example, is segmented according to such variables as the packaging of the solicitation and the type of request —whether, for example, people were asked to donate a specific dollar amount.

Staff members query the central data base when they're preparing a new campaign and sort results from previous mailings by any of the predetermined categories. They use *1-2-3* templates stored centrally on the server to analyze the many variables. Because they can call on the often complex formulas co-workers have developed when analyzing previous campaigns, staff members don't have to reinvent the wheel.

Having seen the benefits of building a common data base to track and analyze the volume of mail sent out every week, King is now revamping the system to get even more out of shared resources. The firm is building a new data base system that will allow for greater consolidation of lists as well as expanded querying and analysis capabilities.

But the benefits of the network go beyond improved data analysis, says King. Besides giving clients more bang for their buck, the ability to share information has also allowed the organization to grow without having to hire as many people and has helped new employees get on line faster. The shared data base and predesigned templates have cut down on training time, King claims. "We have more information readily available to new users."

3. Staying Close to Your Customers

Rick Manning, controller for Pine Bluff Warehouse Company in Pine Bluff, Arkansas, is so convinced of the value of LAN-based electronic mail that he's not only talking to his biggest customer about going with it, he's volunteered to fly in and install it himself.

Pine Bluff Warehouse serves as the middleman between the producers and the users of raw materials. The company unloads such freight as grain, soybeans, rice, fertilizer, and steel from barges along the Mississippi and Arkansas rivers and then stores the goods in its warehouses before shipping them on to the end customers.

Constant contact with both the producers and purchasers of the material is imperative, says Manning, who has spearheaded the company's effort to improve communications with customers and remote warehouse locations through electronic mail.

The company first began using E-mail to keep communication open between the main facility in Pine Bluff and its warehouses and ports in Fort Smith, Osceola, West Memphis, and Helena—all located on the Arkansas and Mississippi rivers.

"Before we had E-mail, communication between the sales offices and the terminals [ports] was by telephone and mail," Manning reports. "Sometimes customers were quoted shipping rates that didn't make it to the rate book."

Each of the company's offices now has an Ethernet network running Novell's NetWare. The networks run *Da Vinci eMail*, and dedicated PCs serve as gateways between them.

Manning set up the E-mail system in two marathon weekends in 1989. "I drove four hours to Fort Smith, worked all day, then the next day to West Memphis, worked all day Sunday, then to Helena and worked all Labor Day," he recalls. Once he had each of the three E-mail systems up and running, he worked throughout the next weekend to link them all together. "This is not the type of thing that normal people should try," he cautions.

Now that the system is up and running, Manning is trying to convert some of Pine Bluff's larger customers to electronic mail. "One of our big customers wants to speed up the processing of our reports to them. They need daily receipts as evidence of shipments so they can bill their end customers. We're in the middle—we load the trucks, and at that point, our customer needs to know that the product's been sold."

After that customer gets linked up, Manning has another account to work on. "A company in Memphis buys steel, and we store it in our warehouses," he says. "The less inventory they have, the better, so they'd like to be able to access our inventory data base." With remote communications software such as *Carbon Copy,* which Manning already uses to maintain the remote networks, the customer can call in to the Pine Bluff network and check on its materials.

Using electronic communications to stay in close touch with customers is nothing new to Pine Bluff Warehouse Company. The firm is already linked to most of its major steel company customers via an EDI (electronic data interchange) connection that enables vendors and their customers to gain remote, real-time access to each other's inventory and order data bases using inter-LAN communications.

Pine Bluff, for example, receives word via the EDI link about the shipment of one coil of steel to be stored in the warehouse. "Once it arrives," explains Manning, "we unload it and key into the data base that it's arrived and has been put in inventory. That information is then transmitted back to the steel company through EDI." A similar process is followed when it comes time to transfer the inventory to an end customer. Pine Bluff gets electronic authorization to release inventory, then sends notification of shipment and changes in inventory back to the steel company.

"The network...defines our existence," says Boeing automation manager Craig Dupler.

The benefits of linking up with customers are clear: Up-to-the-minute information about shipment and delivery of goods enables Pine Bluff to get the invoices out to its customers that much faster, which ultimately means that revenue comes in more quickly.

As with any service-oriented business, what's good for customers is also good for Pine Bluff. The firm is looking for ways to capitalize on its use of PC network technology to share vital data with its customers, says Manning. "It's a powerful sales tool when we're recruiting new customers."

4. Enterprisewide Access to Data

For the Boeing Company's Aerospace and Electronics Division in Seattle, the network is more than just useful. "It defines our existence," says Craig Dupler, automation manager of the P-3 Group.

Dupler's group is charged with building what is essentially an airborne network for the Navy's submarine-hunting airplanes. Roughly 500 people are involved in the project, from hardware and software designers to finance and planning staff.

Although the software engineering teams primarily use Digital Equipment's VAX minicomputers and Sun workstations, the remaining employees use DOS-based PCs. Everyone—regardless of their computing platform—is on the same Ethernet network, running Novell NetWare.

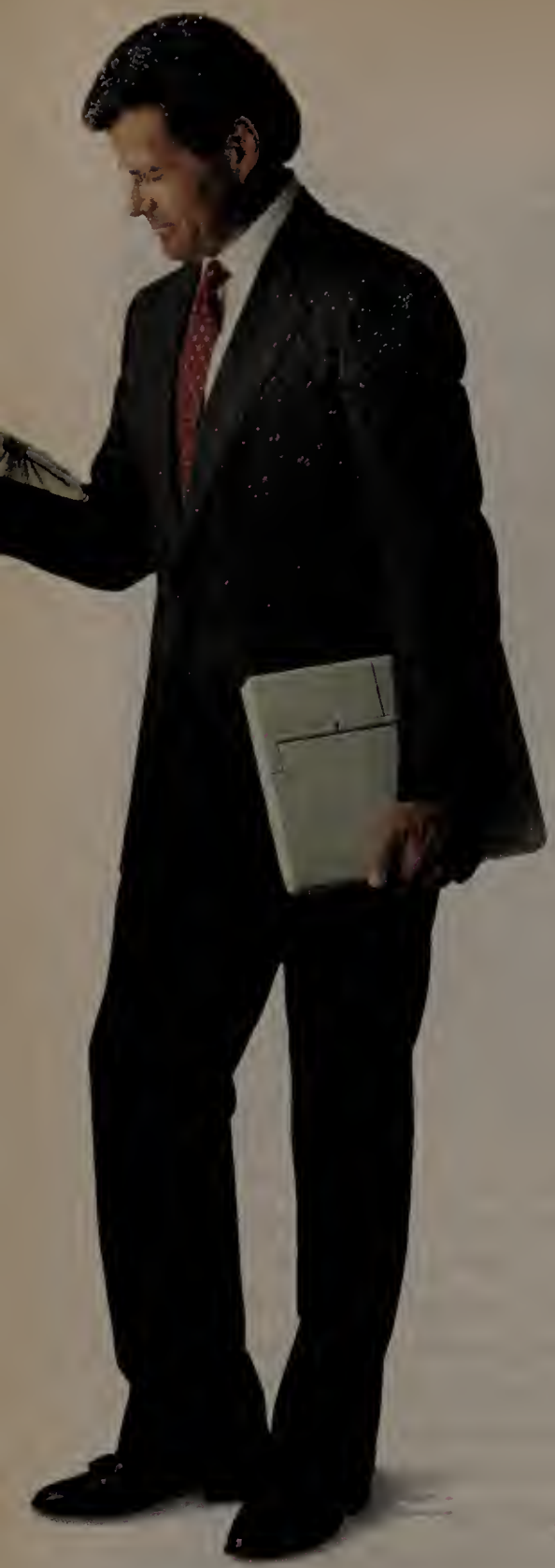
"It's how we communicate," says Dupler. "All of our important business data is there." The network provides access to all the company's finance data and program-planning information. It also helps management keep up with contract changes and monitor the performance of the various teams. The teams themselves use the network continuously: Engineers, for example, use the network and electronic mail to exchange ideas with the product development team. Similarly, subcontractors, who develop some 65 percent of the programs, deliver data to the network via remote communications software.

Enterprisewide access to data across this large network hasn't always been as smooth as it is today. Because the network is spread across ten servers, users were having trouble navigating through the volumes of data at their disposal to find the single piece of information they needed. "How do you put information on the computer such that it's readily accessible to everyone?" asks Dupler.

Rather than try to teach users a new way of finding information, Dupler decided in 1987 to use an information paradigm his users were already familiar with: the organizational chart. "Boeing lives by org charts," he says.

To find information, all the user needs to know is which department within the organization is responsible for the data. "Let's say that somebody is going to come in from the defense audit agency and do a check," explains Dupler. "He wants to see that I have the papers authorizing us to spend the government's money. All I need to do is log on to the integrated data base program, ask for business organizations and then finance, and up comes a menu of data bases they have up there. One of them is 'authorizing paperwork,' and there I'll find everything I need to pass my audit."

The size of Boeing's network compli-



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MATHEW McVAY

Without the network, Craig Dupler says his division would have to "pack up and go home."

PROBLEM: Users in Boeing Aerospace and Electronics' P-3 Group needed an easy way to access business data and communicate with co-workers across a 500-workstation LAN.

SOLUTION: A custom data base application that uses the organizational chart metaphor to locate and retrieve data; groupware application for E-mail and scheduling.

BENEFITS: Eliminates the need for users to know where information is stored; provides seamless links among users regardless of their hardware platform.

cated more than just data retrieval. With so many functions spread across the network, users weren't always sure how to complete some of the most basic tasks. "Even things like logging on to the right server or printing to the right location can be a problem," Dupler says.

So he wrote two more applications that display a map of the building. "The floor plan is broken into color-coded zones that correspond to a colorful pull-down menu," Dupler explains. "You locate the zone you want to log on to, highlight it, then go ahead and execute the log-on with a carriage return. You don't need to know the server name or any associated commands."

Printing takes the process one step further. "Once you select a file server and printing program, up pop pictures of the printers available at that location," Dupler says. "You select the device you want to go to, and the application routes your output."

Much of the system was written in six months by Dupler with the help of just one other person. "Our interface isn't as nice and slick as *Windows*, but it's not bad," he says. "It's colorful. And it doesn't crash."

Dupler's goal, which he has largely accomplished, is "total automation. We have integrated our entire computer environment in our network," he says. "On our network are all of the systems that are used in our day-to-day efforts—the big VAXes we use to test hardware that goes on the aircraft, three different CAD systems to do design work and generate production data—and the original data may reside in any of those environments. We're moving information from one system to another all the time."

What would Dupler's division do without its network? "Pack up and go home," he says. "It's our way of life."

5. Developing Group Documents

"We live and die by the published paper," says Mark Johnston, network administrator for the College of Oceanography at Oregon State University in Corvallis. Each year the university's team of researchers competes with hundreds of academics throughout the world for the grants that make their work possible. The atmosphere isn't quite as cutthroat as on Wall Street, but in many ways it's just as competitive.

To stay on the leading edge of research and to maintain an adequate level of grant funding, the oceanographers are always on the lookout for ways to improve both the collection of research data and the final production of research papers. One of the best tools they've found to date is their local area network.

For years researchers worked on terminals hooked up to a Prime mainframe—a setup that proved both inflexible and expensive. Upgrading the software and the hardware to adapt to the college's changing needs was time-consuming and disruptive, explains Johnston. "You bring in a new mainframe, and it takes a year to get it up and running and the kinks worked out. Meanwhile, nobody's gotten a lot done." Even when the system was functioning properly, the arcane command structure and awkward interface put users off, says Johnston.

Finally retiring the mighty mainframe, the College of Oceanography installed a network four years ago. About 100 PCs and Macintoshes plus another 60 Sun workstations are now linked over

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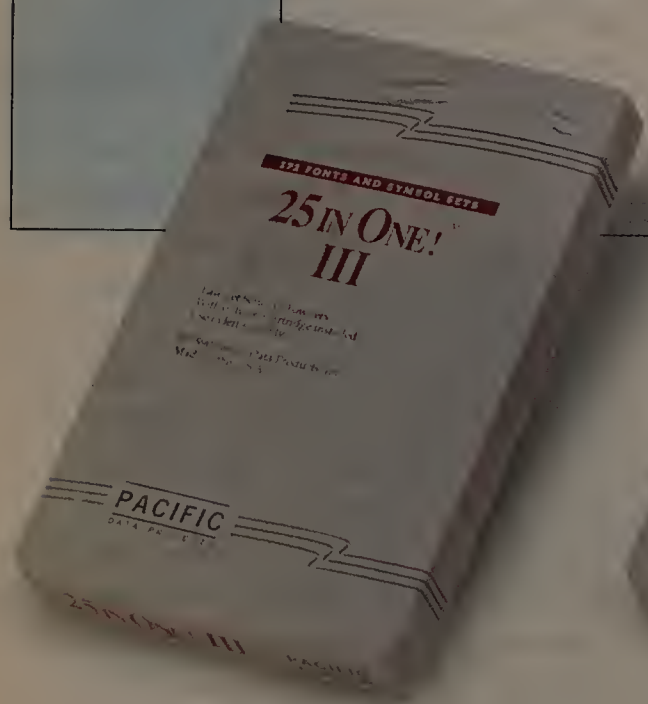

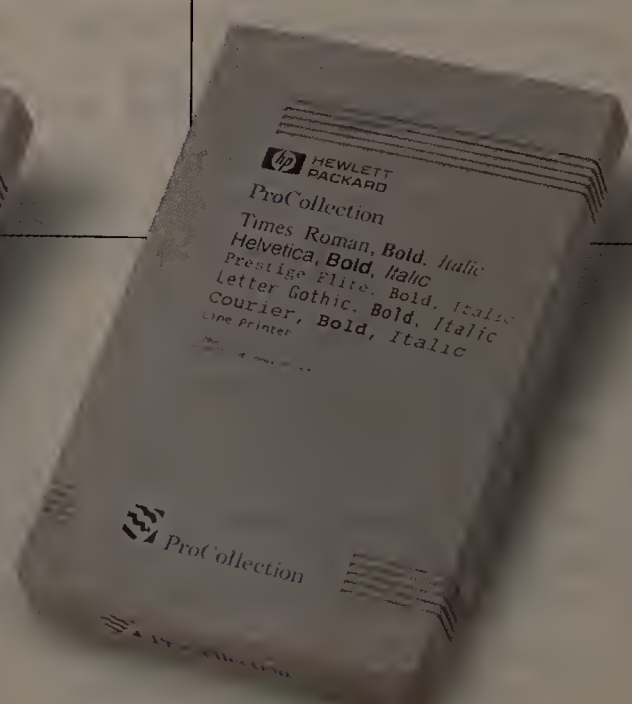

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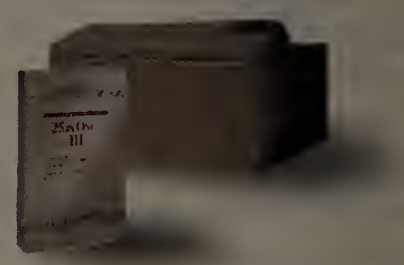

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THE TEN DEADLY NETWORK SINS

If you're guilty of committing any one of these, chances are you're not getting the most out of your network.

Roberta Furger

We've all heard the horror stories of a network gone wrong, but what causes the catastrophes that leave users and managers cursing the day the network was installed?

PC World asked Patrick Corrigan, managing director of the San Francisco–based network consulting and training firm The Corrigan Group, to discuss the most frequently encountered networking mistakes. Not surprisingly, most of the troubles organizations encounter come down to unrealistic expectations about the commitment required in planning, installing, and managing the net.

1. The "I'll do it myself" installation. Networks are "complicated stuff," says Corrigan, and too many companies install their own LANs, without sufficient experience or knowledge. His advice? Hire a professional trained in network design and installation to walk you through—or take over—the process.

2. The "bargain basement" approach. Shopping for the cheapest hardware and operating system may ease the initial pain of investing in networking technology, but bargain shopping will cost you when you run into the inevitable incompatibilities. Make sure you buy from reputable hardware and software vendors committed to supplying adequate support.

3. Using an untested reseller or system integrator. "Too many people are orphaned by a dealer, VAR [value-added reseller], or consultant when things don't go right," says Corrigan. To save yourself from that fate, he suggests getting references, particularly from companies that have implemented a LAN in a similar environment.

4. Poor planning and design. Most networks just happen, says Corrigan. But as the network gets bigger and takes on a more critical role, the lack of planning becomes all too evident. Corrigan suggests that issues such as user account information, directory structures, and deciding who has access to different types of data should be hammered out when the network is installed—

DEBRA SOLOMON

with an eye toward future growth.

5. Unrealistic expectations. Most organizations install a network expecting it to be a quick and easy process. Neither is ever true, says Corrigan, adding that the payoff might be months—or years—away.

6. Assuming everything will work when the last wires are connected. Rarely is this the case, says Corrigan, even if you've got a professional network installer handling the project. The lesson? Don't move your strategic applications over too quickly. Assume you'll have a shakedown period while all the bugs get worked out.

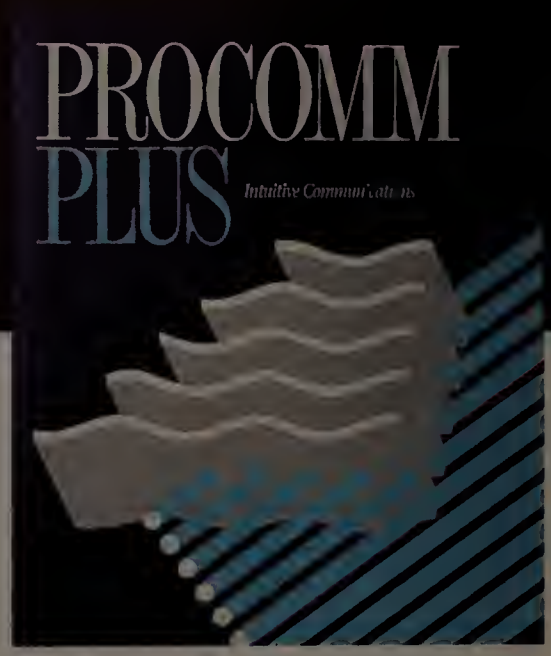
7. Networks maintain themselves, right? One of the most serious mistakes a company can make is assuming that anyone can manage the LAN, says Corrigan. Every network—regardless of its size—requires the ongoing attention of a trained network administrator. Backups, application installation and maintenance, management of user accounts, and hardware and software compatibility are just a few of the issues the network manager will have to deal with almost daily.

8. Lack of user training. Many companies don't recognize the need to train users how to work effectively in a networked environment. Instead, users are simply given a password and shown how to log on to the network. But, says Corrigan, users need to be schooled in issues such as dealing with shared peripherals and shared applications.

9. Improper backup. A major source of trouble for networks of any size, says Corrigan, is a failure to follow proper backup procedures. Intermediate backups should be done regularly—nightly, ideally—and with proper redundancy, says Corrigan. Full backups should be done as often as possible. "Don't ignore menus and batch files," says Corrigan, noting that you can spend countless hours reconfiguring systems.

10. Disaster recovery? We'll think about that tomorrow. Every company, says Corrigan, needs a comprehensive disaster recovery plan, but it's particularly critical when your business depends on the smooth operation of the network. Key issues include the impact of the system going down, the amount of time required to get the network back up and running, and designating an individual or individuals who'll be responsible for implementing the recovery plan.

Out of the prairie comes proof that a higher level of communication has arrived.



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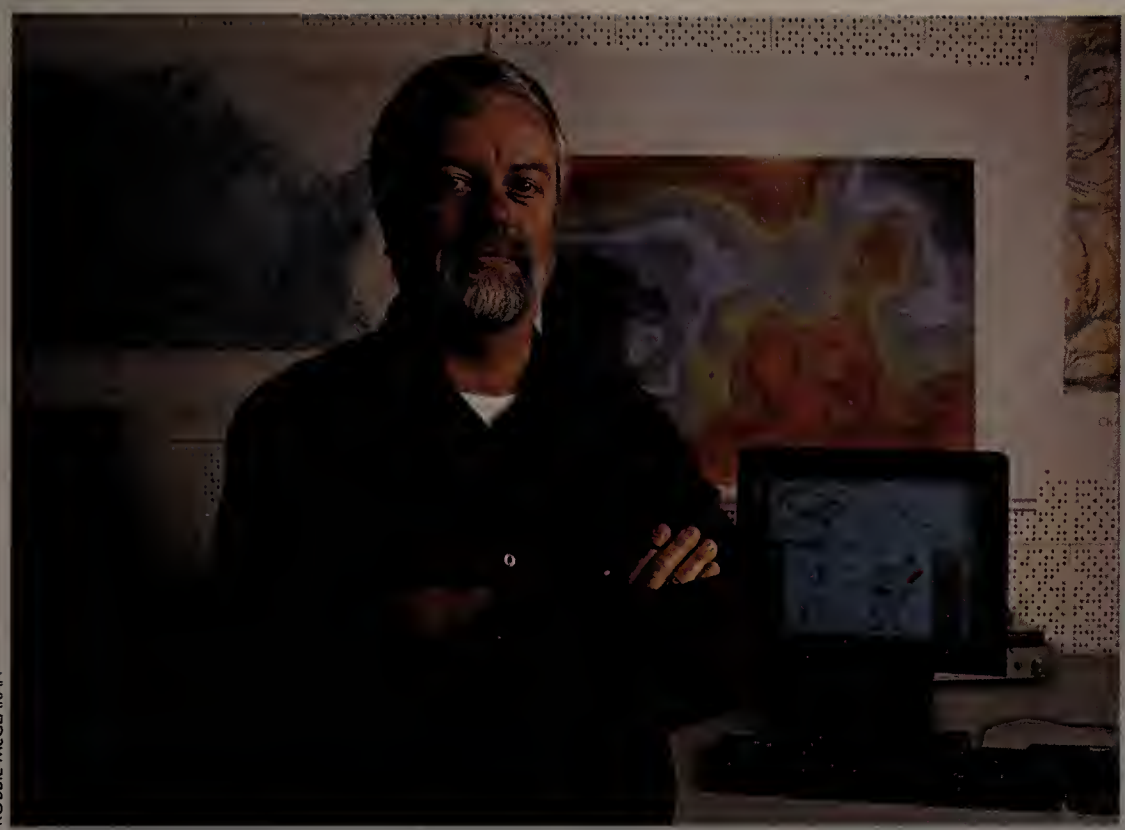


ROBBIE McCLARAN

Editing group documents is a snap on the net, says research associate R. Dale Pillsbury.

PROBLEM: Researchers at Oregon State's College of Oceanography needed to share research and manage the preparation of group documents.

SOLUTION: A TOPS network linking PCs, Macs, and UNIX workstations lets users share files easily.

BENEFITS: Allows researchers to work on platform of choice without sacrificing interoperability; provides for streamlined preparation of group documents; facilitates sharing of data with fellow researchers regardless of their location.

Ethernet and AppleTalk networks running the *TOPS* network operating system from Sitka. As a result, the ways in which the oceanographers gather data and prepare research papers have changed dramatically.

One of the most notable changes has been the move toward a more collaborative approach to research. Formerly, the university labored under a one-to-one relationship between researcher and research paper. "We now have a number of researchers working together, or working with other researchers in the United States and around the world, on the same project," says Johnston.

Using shared modems, networked researchers can now communicate with colleagues throughout the world via wide area networks such as Internet, an international network for colleges, universities, and research institutions. "The turnaround time is usually about ten minutes," Johnston says, and even real-time "conversations" are possible.

"I work with people at Texas A&M, at Columbia University, and at the University of Washington," says research associate R. Dale Pillsbury. "It really doesn't matter where they are, as long as they're on the electronic network."

Although researchers had access to Internet via the Prime mainframe, they rarely took advantage of it, says Johnston, because of the user interface on the Prime. "Users weren't willing to spend time learning the long sequence of character commands required to log on to the network," he notes.

As a result, it used to take days to share data with a colleague outside the university. "Now it's all done in a matter of minutes," says Johnston, noting that the deadline pressures inherent in research work often made cooperative projects with outside researchers impossible.

The network also makes the physical process of producing manuscripts easier, says researcher Pillsbury. "When we do manuscripts now, we're able to put them out so people can edit them and add to them, all electronically. Editing and revising become much less painful than when we circulated manuscripts and people marked them up."

Because researchers use a combination of Macs, Sun workstations, and PCs, each person working on a manuscript saves his or her work in its native file format. Translating utilities included with the *TOPS* network handle any necessary conversions, and the *InBox* E-mail package shuttles the files back and forth between researchers.

Although they'd like to move to a group-editing application, Johnston says there aren't any products that currently support all three platforms. And the researchers aren't likely to forgo the benefits of picking the platform that best suits their needs. "The benefits for the researchers in being able to pick and choose their own tools have outweighed the overhead," says Johnston.

If you'd asked the 78 oceanographers at Oregon State four years ago what single tool would have the greatest impact on the quality of research produced, chances are they wouldn't have said a network. But in 1991, it's an integral part of their research process that they wouldn't think of doing without—just try to get them to go back to that old mainframe.

Sharon Fisher is a San Francisco–based freelance writer specializing in data communications. Roberta Furger is an associate editor for PC World.

Explore Your LAN Connections

In this diagram, we've attached your PC to a NetWare LAN that's linked near and far—to a group of Macintoshes, a LAN in another location, your company's mainframe, and more. Here's how the connections work, and what you get out of them.

LAN-to-LAN Connections

The AppleTalk bus (a cable or series of cables) linking the Macintoshes is also hooked to an AppleTalk board in the NetWare server. The Macs can run applications stored on the server and even exchange files and E-mail with PCs.

The remote LAN is connected to your own LAN with routers (dedicated PCs with special modems) linked by a high-speed leased phone line. With this setup, you can log in to the remote server just as if it were on your own LAN, though file access may be slower.

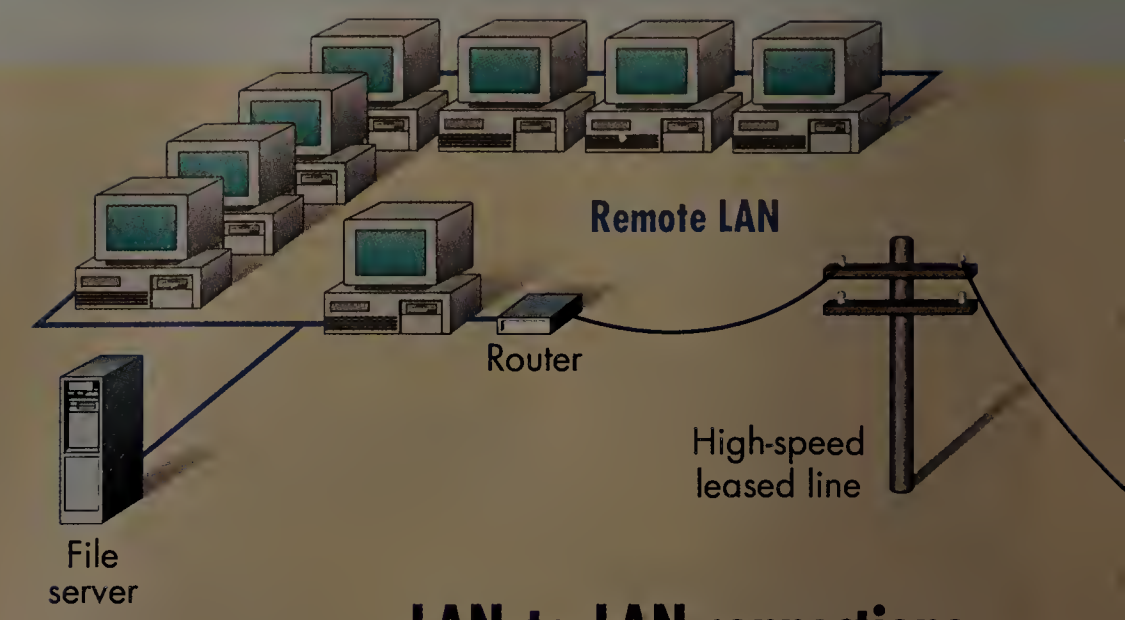
Telecommunications

Three ways of connecting to the outside world are illustrated here. An E-mail gateway PC lets you communicate with other E-mail systems through your LAN E-mail software. A fax server enables you to send and/or receive faxes by way of a link to your E-mail system. And a modem server allows you to run LAN versions of telecommunications programs and to dial out even if you don't have your own modem.

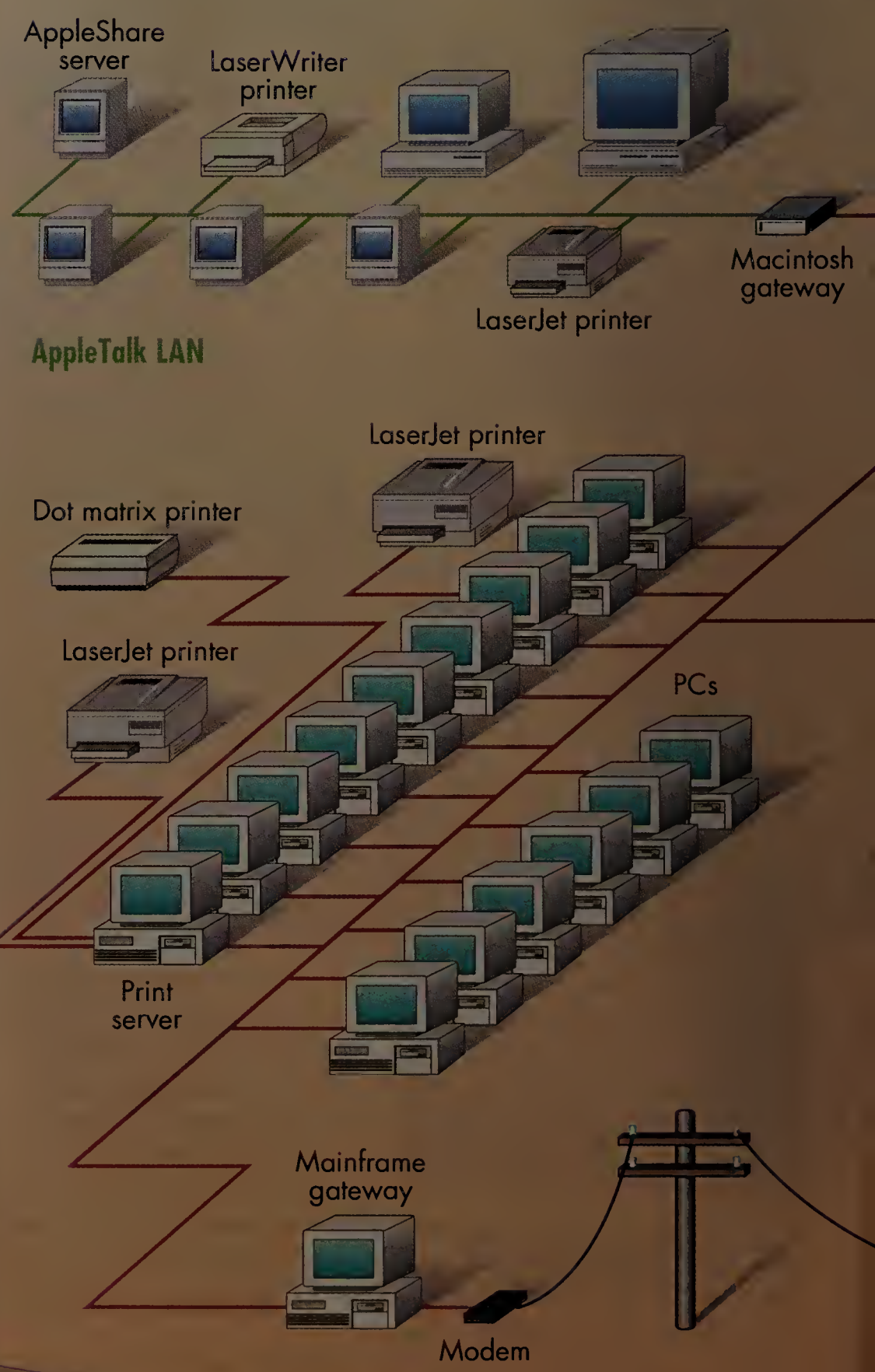
Mini/Mainframe Connections

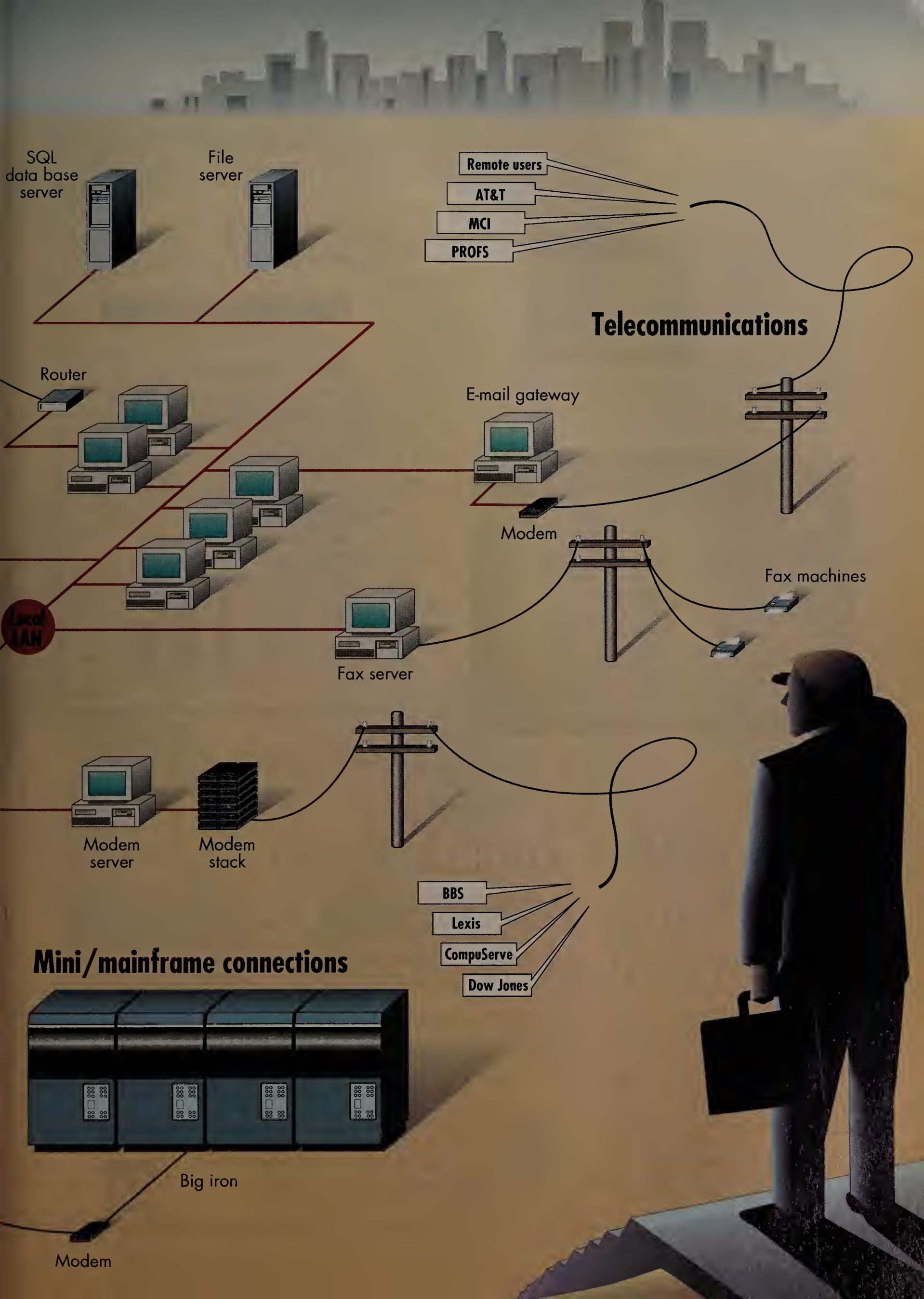
LAN users running special terminal-emulation software can communicate with a mainframe or minicomputer (a "host") connected to the LAN by cable or through a modem hooked to a gateway PC. This setup lets you run host applications as if you were at a mainframe terminal.

CHRIS MORRIS



LAN-to-LAN connections




SQL data base server
File server
Remote users
AT&T
MCI
PROFS
Telecommunications
Router
E-mail gateway
Modem
Fax machines
Local LAN
Fax server
Modem server
Modem stack
BBS
Lexis
CompuServe
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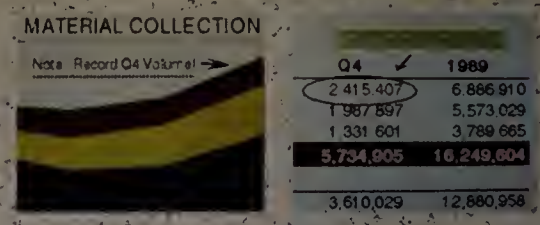
Mini/mainframe connections
Big iron
Modem

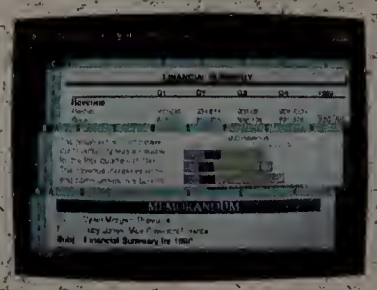
1-2-3 works with either DOS or Windows 3.0. You don't have to change the way you work to work with Release 3.1.

Lotus is the only software company you can call for support 24 hours a day, 7 days a week.



You can add words, freehand drawing and symbols to make your graphs more persuasive.

Enter data with a keyboard; manipulate it with a mouse. Release 3.1 lets you work with either, or both.

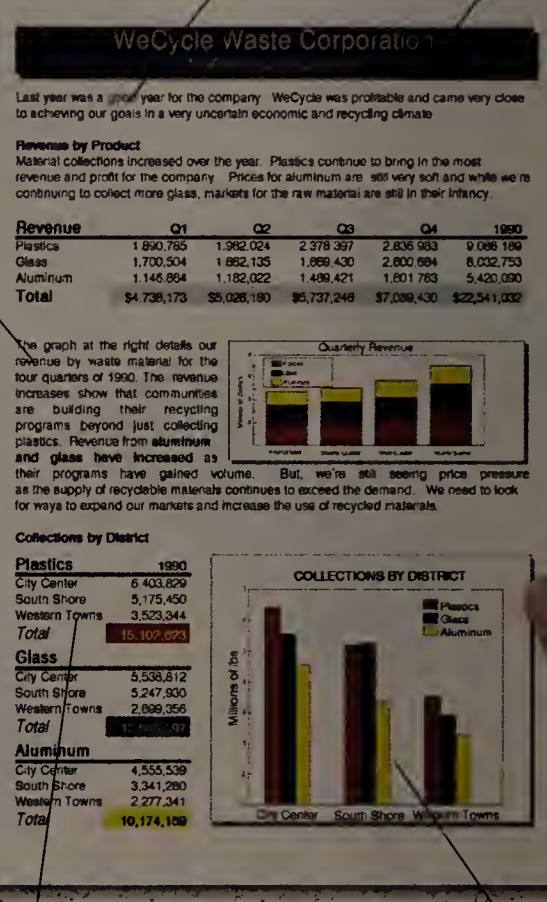


Our unique 3D design is ideal for organizing data and creating multi-page reports.

Eight combinations of typefaces let you create anything from 2½" tall headlines to tiny footnotes.

Align titles or text—left, right or center—with one simple command.

Only Release 3.1 lets you automatically wrap text around a graph.



WeCycle Waste Corporation

Last year was a good year for the company. WeCycle was profitable and came very close to achieving our goals in a very uncertain economic and recycling climate.

Revenue by Product

Material collections increased over the year. Plastics continue to bring in the most revenue and profit for the company. Prices for aluminum are still very soft and while we're continuing to collect more glass, markets for the raw material are still in their infancy.

Revenue	Q1	Q2	Q3	Q4	1990
Plastics	1,890,785	1,982,024	2,378,397	2,835,983	9,086,189
Glass	1,700,504	1,862,135	1,869,430	2,600,684	8,032,753
Aluminum	1,146,884	1,182,022	1,489,421	1,601,763	5,420,090
Total	$4,738,173	$5,026,180	$5,737,248	$7,039,430	$22,541,032

The graph at the right details our revenue by waste material for the four quarters of 1990. The revenue increases show that communities are building their recycling programs beyond just collecting plastics. Revenue from **aluminum and glass have increased** as their programs have gained volume. But, we're still seeing price pressure as the supply of recyclable materials continues to exceed the demand. We need to look for ways to expand our markets and increase the use of recycled materials.

Quarterly Revenue

Collections by District

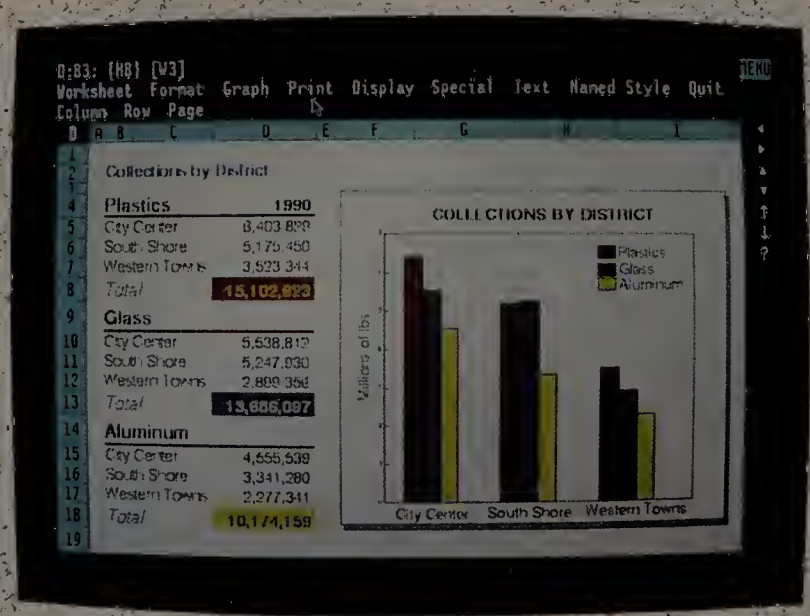
Plastics	1990
City Center	6,403,829
South Shore	5,175,450
Western Towns	3,523,344
Total	15,102,623
Glass	
City Center	5,538,812
South Shore	5,247,930
Western Towns	2,899,356
Total	[illegible]
Aluminum	
City Center	4,555,539
South Shore	3,341,280
Western Towns	2,277,341
Total	10,174,159

COLLECTIONS BY DISTRICT

Plastics Glass Aluminum

Millions of lbs

City Center South Shore Western Towns



A graphical WYSIWYG (what-you-see-is-what-you-get) environment shows you exactly what your output will look like. It's easier to work with, and there's no guesswork.

Mix bold, italics, underlines, colors and typefaces to create over 100 text-style combinations—more than any other spreadsheet.

You can choose from over 200 graph style combinations—even display more than one graph per page.

Since 1983, 7 out of 10 spreadsheet buyers have chosen 1-2-3.* Now we're going after the other 3.

Over 10 *million* business people are more productive and more insightful because of Lotus 1-2-3.

Now Lotus introduces 1-2-3 Release 3.1.

And if you're currently using 1-2-3, you'll find it offers the features you've been wishing for. Like the ability to see, on screen, exactly what your printed output will look like. Our unique 3D approach to organizing and consolidating spreadsheet data. And the most professional and persuasive printed reports you've ever created on your computer.

Or if you're one of the holdouts not using 1-2-3, you'll find it offers an interactive, graphical environment. Plus it works with Windows 3.0. And supports both a keyboard and a mouse.

We've prepared a free demo disk to show you what 1-2-3 can do for you. **First time buyers should visit their local Lotus Reseller. Or to request a Release 3.1 Auto Demo, call 1-800-TRADEUP, ext. 329.**

And see why 7 out of 10 spreadsheet buyers chose 1-2-3. And the other 3 may not be far behind.

Introducing Lotus 1-2-3 **3.1**

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*As reported by Audits & Surveys, Inc., measuring IBM-Compatible spreadsheet sales among computer and software dealers nationwide

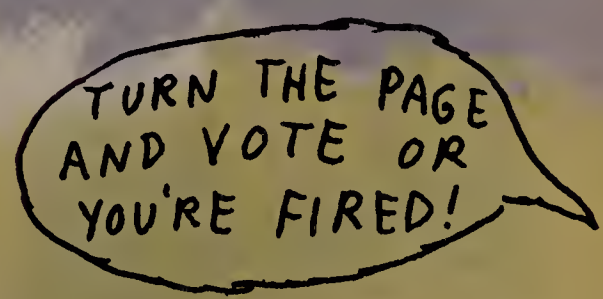
Why is Arnold Harris smiling?

WINNING ISN'T EVERYTHING-- IT'S THE ONLY THING.

He's hoping to win thousands of dollars' worth of hardware and software simply by voting in PC WORLD's World Class contest.

Don't let Harris beat you to the punch. Fill out the postage-paid ballot on the next page, and you could snag a dream desktop PC along with more than 40 hardware and software products...or a powerful portable computer...or a notebook PC for on-the-go computing.

So grab a pen and let your voice be heard! Guaranteed prizes to the first 100 readers who mail in their ballots.



MARK MAREK

Prizes, Prizes, Prizes $50,000*

*Exact prize value is determined after ballots are received and counted.

HOW TO ENTER

Voting in PC WORLD's 1991 World Class Awards contest is easy. Simply write the names of your top-rated products along with your own name and address on the ballot on the opposite page and return it to PC WORLD. The product receiving the most votes in each category will be designated a World Class winner. Winners and runners-up will be announced in the October 1991 issue of PC WORLD.

HOW TO WIN

When you mail in your ballot, you're not only voicing an opinion—you're also making yourself eligible for a pile of prizes worth almost $50,000!

FIRST PRIZE

The winning Super PC Desktop System, plus the highest-rated peripherals (from laser printer to scanner) and all of the winning software—from a total of over 40 categories!

SECOND PRIZE

The most popular portable computer.

THIRD PRIZE

The favored notebook computer. Don't be shy—and don't delay!

The first 100 voters will receive PC WORLD's exclusive Two-Fisted Management T-shirt and book combo. Remember, your vote *can* make a difference!

MARK MAREK

CATEGORY DESCRIPTIONS

To help you cast your votes, we've supplied background information on product categories that may not be self-explanatory.

PORTABLE COMPUTER Includes both easy-to-transport AC-powered computers and larger laptops that can run on AC or batteries.

NOTEBOOK COMPUTER Battery-powered computers that fit inside a briefcase (typically 12 by 10 by 2 inches or smaller) and weigh less than 10 pounds.

INK JET PRINTER Color or black-and-white printers that form characters and images by spraying tiny jets of ink on either plain paper or specially coated stock.

FAX BOARD An internal expansion board that can receive and/or send faxes. Many include a separate 1200- or 2400-bps modem.

MASS STORAGE All disk-oriented forms of mass storage, such as hard disk drives, removable hard disk drives, optical disk drives (erasable, WORM, and CD ROM), and high-capacity floppy drives.

TAPE BACKUP DRIVE Internal or external tape drives designed to back up stand-alone PCs or networks.

SCANNER Flatbed, sheet-fed, or hand-held scanners designed to digitize images and/or provide optical character recognition (OCR).

POINTING DEVICE Mice, trackballs, light pens, digitizing tablets, and so on.

LOCAL AREA NETWORK—BOARD* Tell us which LAN you think merits the most attention. We're looking for the names of network adapter boards that link PCs in a LAN—*not* the name of the network's file server or operating system.

FONT PACKAGE Includes font-generating programs, prepackaged bit-mapped fonts and PostScript font outlines, PostScript software emulators, and PCL and PostScript font cartridges.

DRAW/PAINT Draw programs create object-based vector images used for highly detailed technical illustration, graphic design, and fine art. Paint programs work with bit maps—clip art, scanned images, and screen captures—and are commonly used for editing gray-scale files and creating desktop slide presentations.

SPREADSHEET UTILITY Programs that add features to or enhance existing spreadsheet functions, such as add-in word processors and data base managers, file compression programs, report writers, and templates designed for specific tasks, such as tax preparation or financial analysis.

RELATIONAL DATA BASE Powerful data managers that allow you to update and interrelate multiple data bases, and that come with procedural command languages, application generators, QBE and other sophisticated query systems, band-oriented report writers, SQL support, and more.

FLAT-FILE DATA BASE Nonprogrammable data managers that typically work with one file at a time and are used to maintain mailing lists, contact lists, and the like. These programs can't edit more than one table at once, and their relational skills are typically limited to lookup tables.

FORMS SOFTWARE Programs that let you design and print out forms, from invoices to travel vouchers.

LAN E-MAIL Electronic-mail programs that allow users on a local area network to send and receive messages, attach files, create shared bulletin boards, and more.

LOCAL AREA NETWORK—OPERATING SYSTEM* Note which network operating system you think is the best. Please include version number.

ON-LINE SERVICE/BBS On-line services and electronic bulletin boards that offer electronic mail, specialized data bases featuring everything from legal citations to statistical data, interactive forums, public domain and shareware programs, and other services. The first-prize winner will receive a free one-year subscription or 20 hours of on-line time (whichever value is greater).

SHAREWARE FAVORITE Pick your favorite shareware program in any category. The first-prize winner will receive the latest registered version of the program, plus printed documentation if available.

BACKUP PROGRAM Commercial programs that back up your hard disk to floppies or tape and offer features such as full and incremental backups, file compression, scripts, and more.

PERSONAL INFORMATION MANAGER PIMs, personal organizers, desktop managers, text bases, and other products that replace deskbound Rolodexes, notepads, calendars, etc.

INTEGRATED Programs that incorporate several applications—such as word processing, spreadsheets, graphics, and data management—and share a common interface and command structure. The application may be tightly integrated or available in separate modules.

OPERATING SYSTEM/ENVIRONMENT An operating system or the environment that extends it. Operating environments allow you to share data among different off-the-shelf applications. They're often called windowing environments and sometimes feature graphical user interfaces.

PRESENTATION GRAPHICS Programs that primarily produce charts for business presentations.

PROJECT MANAGER Programs that track the tasks and resources associated with a project and graphically display project progress in a Gantt, PERT, or CPM chart.

ACCOUNTING Covers programs that provide double-entry accounting capabilities. General Ledger, Accounts Receivable, Accounts Payable, and other modules may be integrated in one package or available for separate purchase.

PERSONAL FINANCE Includes programs used to track personal expenses and income but does not include accounting packages (see above).

MOST PROMISING NEWCOMER Vote for the recent software and hardware arrivals that you feel have had the greatest impact on personal computing. *Recent,* in this case, means the product was released after September 1, 1990.

BEST SERVICE AND SUPPORT—HARDWARE COMPANY* Which commercial hardware company do you think provides the best service and support? When voting, consider the cost, quality, and availability of a company's technical support, length of warranty, availability of on-site repair, toll-free numbers, extended warranties, and other related services, such as a customer BBS or on-line forum.

BEST SERVICE AND SUPPORT—SOFTWARE COMPANY* Tell us which commercial software company provides the best service and support, using the guidelines noted above.

BEST MAIL-ORDER COMPANY* Your vote is critical here, since more and more users are buying software and hardware through the mail. Key factors to consider: prices, technical support, on-site repair facilities, refund and return policies, and so on.

*No prize will be awarded for this category—but your vote will be heard in the industry.

Early-Bird Prize to the First 100 Readers Who Send In Their Ballots

PC WORLD 1991 WORLD CLASS AWARDS BALLOT ENTRY FORM

DEAR READER: Please use this entry form to vote for products you are familiar with and would recommend, based on their performance and value. Choose one product per category; you don't have to vote in all categories. Eligible products must be IBM PC compatible and commercially available as of February 1, 1991. To ensure accuracy, please supply (1) manufacturer's name, (2) name of product, and (3) model number for hardware, or version number—if applicable—for software.

NOTE: Only one entry per person. Entries must be submitted on on officiol entry form ond postmorked by April 15, 1991. If you don't hove on officiol entry form, you con receive one by sending o stomped, self-oddressed envelope to PC WORLD, World Closs Bollot Request, 501 Second St. #600, Son Froncisco, CA 94107.

PLEASE PRINT OR TYPE ALL INFORMATION

NAME

COMPANY

ADDRESS

CITY STATE ZIP

DAYTIME PHONE HOME PHONE

*T-SHIRT SIZE: S M L XL *T-SHIRT AND BOOK AWARDED TO THE FIRST 100 RESPONDENTS

DETACH ENTRY FORM AND MAIL TODAY!

HARDWARE

	MANUFACTURER	NAME OF PRODUCT	MODEL NUMBER
Sample entry	XYZ COMPANY	PERFECT PC 386SX	16
Desktop Computer (first prize)			1
Portable Computer (second prize)			2
Notebook Computer (third prize)			3
Laser Printer			4
Dot Matrix Printer			5
Ink Jet Printer			6
Monitor			7
Modem			8
Fax Board			9
Memory Expansion Board			10
Graphics Board			11
Mass Storage			12
Tape Backup Drive			13
Scanner			14
Pointing Device			15
Local Area Network—Board			16
Most Promising Newcomer—Hardware			17
Best Service and Support—Hardware Company			18

SOFTWARE

Word Processing			19
Word Processing Utility			20
Desktop Publishing			21
Font Package			22
Draw/Paint			23
Spreadsheet			24
Spreadsheet Utility			25
Relational Data Base			26
Flat-File Data Base			27
Forms Software			28
Communications			29
LAN E-Mail			30
Local Area Network—Operating System			31
On-Line Service/BBS			32
Shareware Favorite			33
Utility			34
Backup Program			35
Personal Information Manager			36
Programming Language			37
Integrated			38
Operating System/Environment			39
Game			40
Presentation Graphics			41
Computer-Aided Design			42
Project Manager			43
Accounting			44
Tax Planning or Preparation			45
Personal Finance			46
Most Promising Newcomer—Software			47
Best Service and Support—Software Company			48
Best Mail-Order Company			49

CONTEST RULES

Each person may enter the contest only once. Type or print your choices on the entry form on the previous page. Employees of product manufacturers are eligible to vote for any products other than those sold by their company.

Your entry must include your name, address, and daytime telephone number. Entries must be postmarked no later than April 15, 1991. Employees of PC World Communications and their immediate family are not eligible. Please tape (do not staple) the form closed when mailing.

Vote for Your Favorite PC Products

PC WORLD OFFICIAL WORLD CLASS BALLOT

MARK MAREK

Guaranteed Prizes

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“X!!#@*!!!”

– McKensie Turner, Office Manager

"It's slowing me down. I know it's slowing me down!"

– George Fleming, Administrative Assistant

"I thought you said these were going to increase productivity."

– Matt Sentell, CEO

"I can't work my VCR and they're expecting me to understand this!"

– Helen Lynch, Secretary

"This was a big investment. I'm still waiting for the big return."

– Susan Shirk, Chief Financial Officer

Presenting a co company created b

During the 1980s, personal computer use increased by over 5000%. Even so, some industries saw productivity increase by as little as one percent.

Surprised? Probably not, if you've been listening to the complaints from people around your office. Most often, you hear that the computers are difficult to work with or too hard to learn.

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Ventura Publisher®
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dBase IV®
Microsoft Excel®
Lotus 1-2-3®– Rel. 2.2, 3.0 and 3.1
Freelance Plus®
Harvard Graphics™
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And many more.

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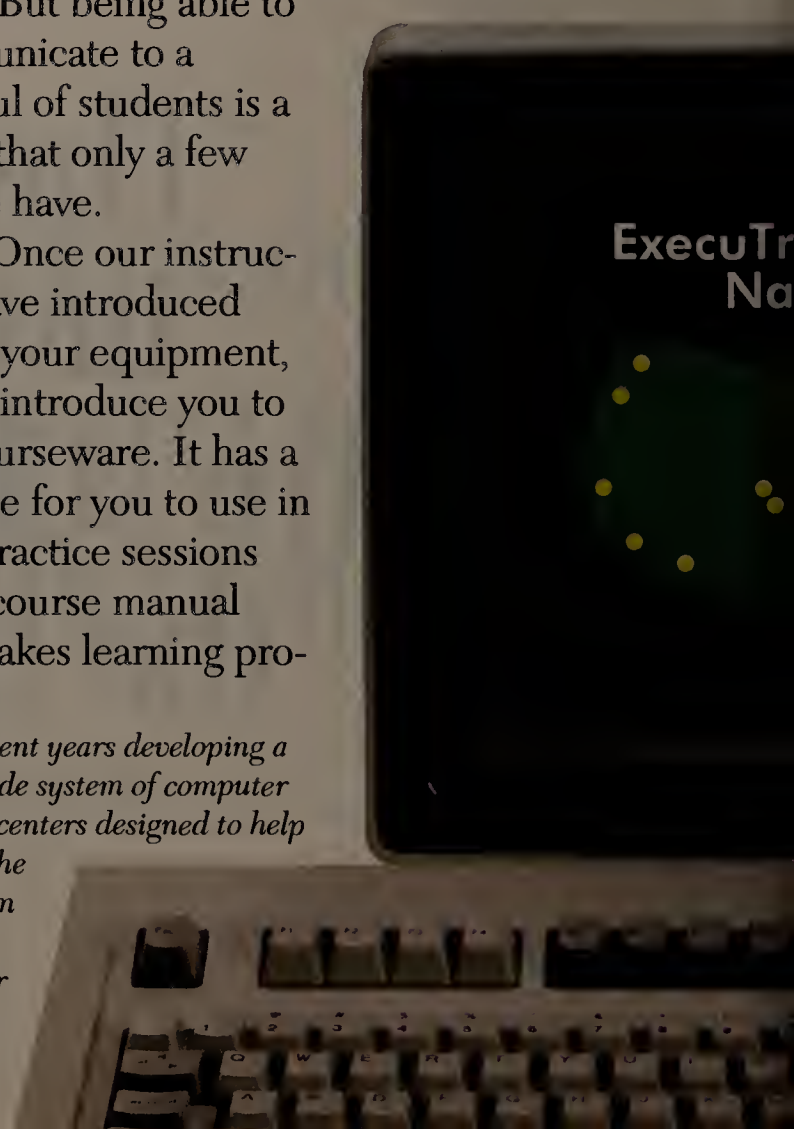

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y popular complaint.

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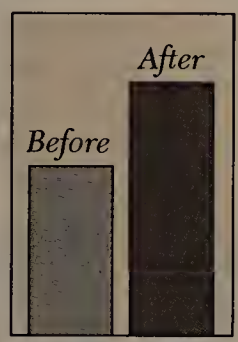

One study showed that you could see up to a 50% improvement in capability for inexperienced users after only one day of computer training.

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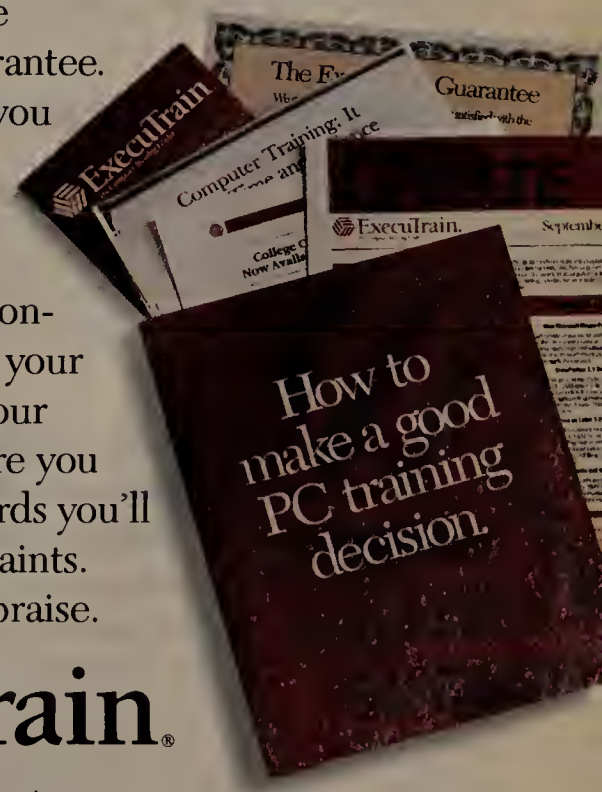

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George Campbell

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Word Processing

A good direct-mail campaign can make a product or company come alive, but a bad one can turn off customers forever. So what makes a good form letter? It's easy to make a form letter *look* personal, but making it *feel* personal is another matter. If you can make your customers feel important even though they know your letter is a fake, you've done a good merge.

Full-featured word processors like *WordPerfect* let you add finesse to your merges by tailoring your letters to each customer's unique situation. This article explains the basics of mail merging and then takes you step by step through an advanced *WordPerfect 5.1* merge that adjusts a letter's wording based on when a customer last made a purchase. You can use this conditional power in other ways, inserting an amount-due paragraph for customers who owe you money or printing letters only for people in a particular state, for instance.

The Basic Merge

Before you merge data and document, you need to create a letter template. Start by writing a letter to one of your customers, then substitute place-holding field markers for the name, address, and other specific information. Use separate fields for a customer's title (Mr., Ms., and so on), first name, and last name, as well as for city, state, and ZIP.

Next, create a data file composed of records for each customer. Each record should contain all of the fields referred to in the letter. The more information you store in each record, the better. For instance, you can use a field containing a

```
                                        {DATE}

{FIELD}First~ {FIELD}Last~
{FIELD}Company~
{FIELD}Address~
{FIELD}City~, {FIELD}State~  {FIELD}ZIP~

Dear {FIELD}Salute~ {FIELD}Last~:

SInce you {IF}{FIELD}LastOrder~>910000~recently {END IF}purchased
the novel {FIELD}Product~ from us, we wanted to let you know about Eric
Norman's latest novel, The Gift, which is sure to become everyone's
favorite summer reading In 1991.

Set in a major city, it portrays a brief but poignant encounter
between two travelers. A major publicity campaign for the novel is
in the works, and The Gift is a National Book Award nominee.

Your customers in {FIELD}City~ will clamor for The Gift, so be sure to
order enough copies to meet the demand. Your price is $13.95 per
copy, but if you order ten copies by June 15, 1991, you can take
advantage of our special price of $12.49 per copy.

C:\CUSTOMER\CUST_LET.PRI                    Doc 1 Pg 1 Ln 1" Pos 1"
```

SCREEN 1: WordPerfect mail merge commands in this primary file are tied to the secondary (data) document. At print time, the two files are combined to produce the finished letters.

```
{FIELD NAMES}Salute~First~Last~Company~Address~City~State~ZIP~LastOrder~Produc
t~~{END RECORD}
================================================================================
Ms.{END FIELD}
Sally{END FIELD}
Gaforth{END FIELD}
West End Books{END FIELD}
123 W. Mariposa Drive
Suite 1422{END FIELD}
St. Louis{END FIELD}
MO{END FIELD}
45111{END FIELD}
910114{END FIELD}
The Fertile Earth{END FIELD}
{END RECORD}
================================================================================
Ms.{END FIELD}
Kate{END FIELD}
Jaekel{END FIELD}
New Horizons Bookstore{END FIELD}
5629 Westward{END FIELD}
Las Vegas{END FIELD}
NV{END FIELD}
89001{END FIELD}
C:\CUSTOMER\CUSTOMER.SEC                    Doc 1 Pg 1 Ln 1" Pos 1"
```

SCREEN 2: The secondary (data) document contains a header, plus records for each customer. Fields in each of the records must correspond to those named in the primary file.

customer's last purchase date, automatically thanking people who bought from you within the last year—even if you never actually print the date. (Enter dates you don't plan to print in numerical format, starting with the year, so that June 24, 1991, appears as '910624').

The rest is easy. Your word processor will combine the letter template and the data in the data file, entering the information wherever the place-holding field markers tell it to. You can also use your data file to produce envelopes or labels to match.

The Perfect Merge

Now let's try this using *WordPerfect 5.1.* First type the letter template, called a "primary file" (see **SCREEN 1** for an example). To insert a field marker into text, press **<Shift>-<F9>** to bring up the Merge Codes menu, and select *Field.* Then type the field name—**Name**, for instance—at the prompt, and press **<Enter>**. '{FIELD}Name~' will appear at the cursor position. To boldface, underline, or otherwise change the appearance of the merged data, use the **<F4>** Block command to select the marker—from the open bracket ({) to the tilde (~)—and use the normal formatting commands to boldface or underline text.

Simply dropping in field markers isn't enough for a conditional merge. These require the more powerful commands on the Merge More menu. For instance, look at the first sentence in **SCREEN 1**; you'll find the curious statement '{IF}{FIELD}LastOrder~>910000~recently {END IF}'. During the merge, this clause causes *WordPerfect* to look at the current record's LastOrder field. If that field contains a number higher than 910000—that is, if the customer has bought something in 1991—*WordPerfect* inserts the word *recently* into the first sentence.

To create this command, bring up the Merge More menu with **<Shift>-<F9>m**, then select *{IF}expr~*. This inserts an IF command in your text and produces an Enter Expression: prompt. You must now enter a marker for the LastOrder field at this prompt, something *WordPerfect* won't let you do. The workaround: Press **<F7><Backspace>** to get back to the editing screen and inside the IF statement, then press **<Shift>-<F9>f**, type **LastOrder**, and press **<Enter>** to insert the field marker. Once the marker is in place, type **>910000**, press **<Cursor Right>** to get outside the IF statement, and type **recently**. (Don't forget the space after *recently*.) Bring up the Merge More menu, and select *{END IF}*.

The Merge More menu also provides the '{DATE}' command used at the top of the letter. When you're done with the letter, name the primary file—CUST_LET.PRI, for example—and save it as you would any other document.

Not of Secondary Importance

The next step is creating a data file—or, as *WordPerfect* calls it, a secondary file. First, construct a header with field names. (*WordPerfect* can use numbers as markers, but field names are easier to remember.) At a blank editing screen, first press **<Shift>-<F9>m**, then select *{FIELD NAMES}name1~... nameN~~*.

From here, *WordPerfect* will prompt you for field names. Enter the ones in your primary file, along with any others you might want, pressing **<Enter>** after each one. After you enter the last field, press **<F7>**. The list will appear, followed by a hard page break. Using the same technique, you can easily change this list at any time.

At this point you're automatically in data entry mode. As *WordPerfect* prompts you for each field, type in the data, pressing **<F9>** at the end of each field (you don't have to press **<Enter>**). At the end of each record, press **<Shift>-<F9>e**.

Don't worry if you come upon a multiple-line address; simply press **<Enter>** to insert an extra line into a field. At the

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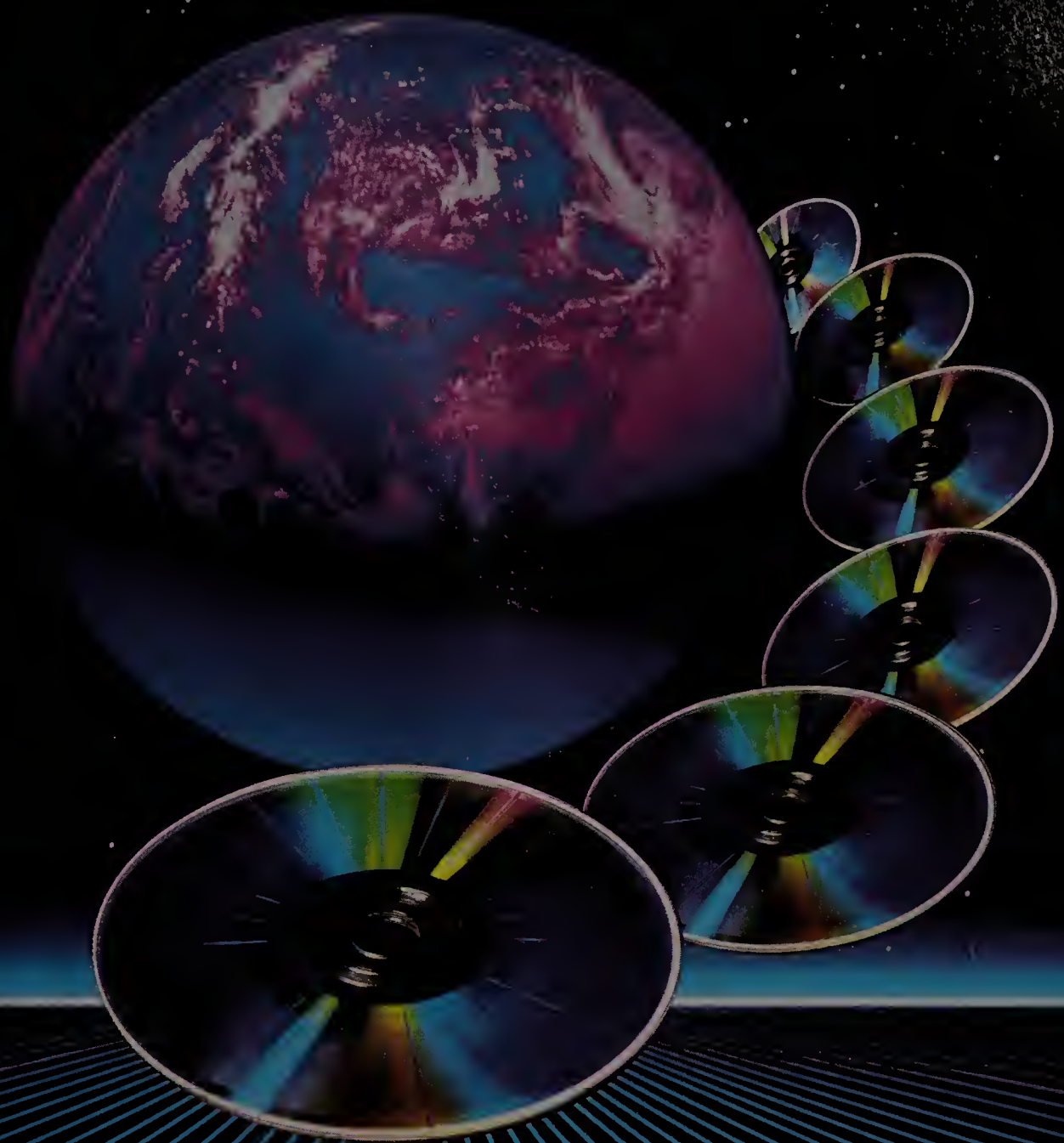

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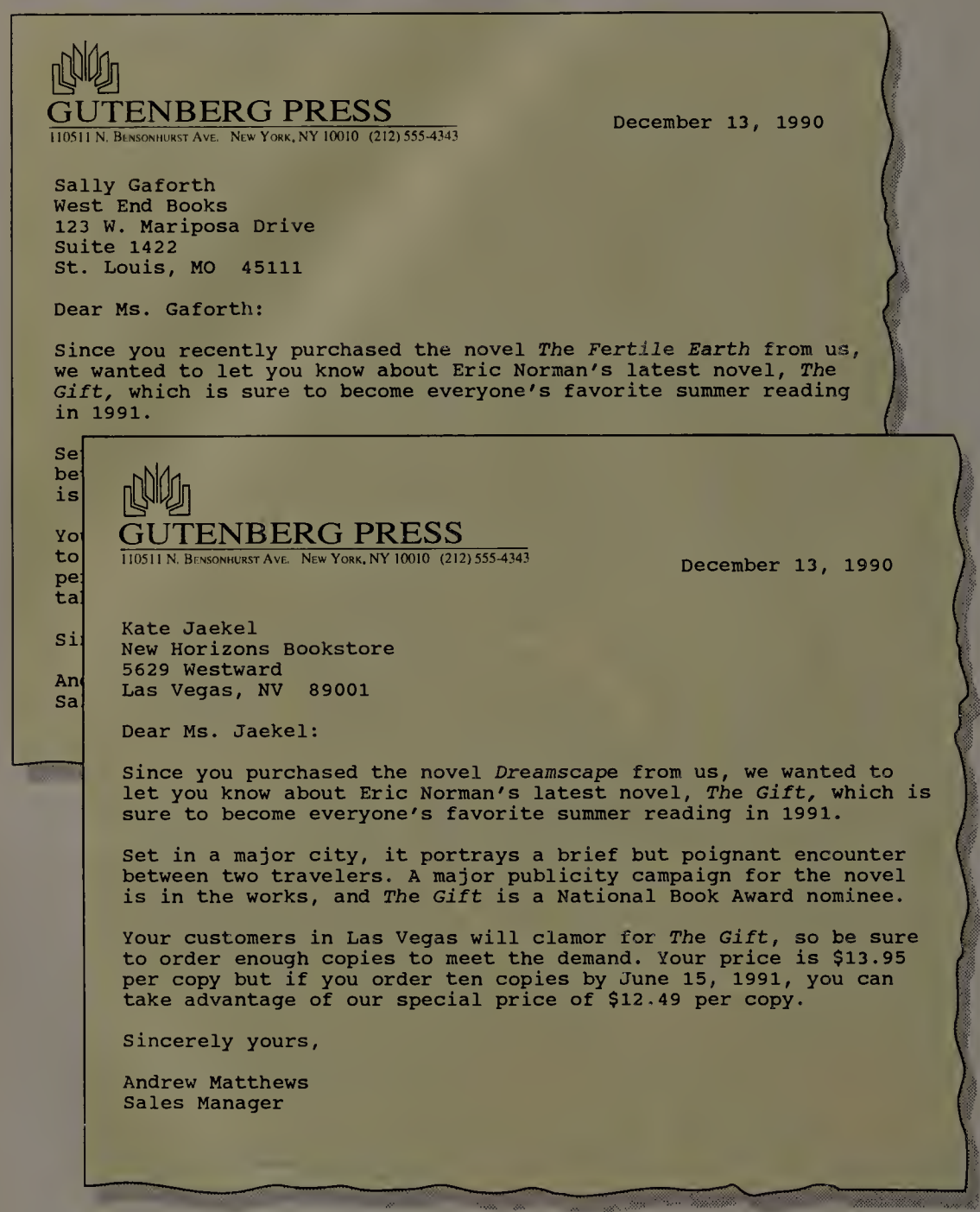

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December 13, 1990

Sally Gaforth
West End Books
123 W. Mariposa Drive
Suite 1422
St. Louis, MO 45111

Dear Ms. Gaforth:

Since you recently purchased the novel *The Fertile Earth* from us, we wanted to let you know about Eric Norman's latest novel, *The Gift*, which is sure to become everyone's favorite summer reading in 1991.

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110511 N. Bensonhurst Ave. New York, NY 10010 (212) 555-4343

December 13, 1990

Kate Jaekel
New Horizons Bookstore
5629 Westward
Las Vegas, NV 89001

Dear Ms. Jaekel:

Since you purchased the novel *Dreamscape* from us, we wanted to let you know about Eric Norman's latest novel, *The Gift*, which is sure to become everyone's favorite summer reading in 1991.

Set in a major city, it portrays a brief but poignant encounter between two travelers. A major publicity campaign for the novel is in the works, and *The Gift* is a National Book Award nominee.

Your customers in Las Vegas will clamor for *The Gift*, so be sure to order enough copies to meet the demand. Your price is $13.95 per copy but if you order ten copies by June 15, 1991, you can take advantage of our special price of $12.49 per copy.

Sincerely yours,

Andrew Matthews
Sales Manager

Note the word "recently" in the top letter. Such touches help a mass mailing feel more human.

end of the field's last line, press <F9> as you would with a one-line field. For a blank field, press <F9> without entering data.

After the final record, name your file—CUSTOMER.SEC, for instance—then save it in the usual manner. The beginning of your file should look something like **SCREEN 2**.

Handling the Data

WordPerfect is no data base, but you can search and sort data in a secondary file. To find a particular customer, use the standard <F2> search tools you use in editing. To sort your data—for instance, if you need to print a report in customer-name order from a secondary file currently in ZIP code order—press <Ctrl>-<F9>s<Enter><Enter>. Press **tm**, then **k** to choose the fields by which the data should be sorted. For instance, to sort a mailing by ZIP code, press **n**, then type the number of the ZIP code field, and press <F7>.

If your customer data is already in another program, *WordPerfect* can probably use it—as long as the other program can export a delimited ASCII file. In this format, a particular character (usually a comma) separates fields, while another character (usually a return) separates records. Of course, if you have commas in your data, you'll have to use another delimiting character. *WordPerfect* lets you change the delimiters, but that's of little use unless your data program allows you to change them as well. Also, if you use an ASCII-delimited secondary file, you must number rather than name your fields.

Making the Merge

With the template and data complete, you're almost ready to print a stack of letters. There's just one more step—testing. If your data file is large, printing an untested merge could waste hours of work and reams of paper.

First, copy your secondary file's header and the first few records to another file—TEST.SEC, for instance. Blank your editing screen, then press <Ctrl>-<F9>m to start the merge. At the Primary file: prompt, type **cust_let.pri** and press <Enter>. At the Secondary file: prompt, type **test.sec** and press <Enter> again. *WordPerfect* will merge the files, bringing up the resulting letters on the editing screen. When you're satisfied with the results, replace the test secondary file with the real one.

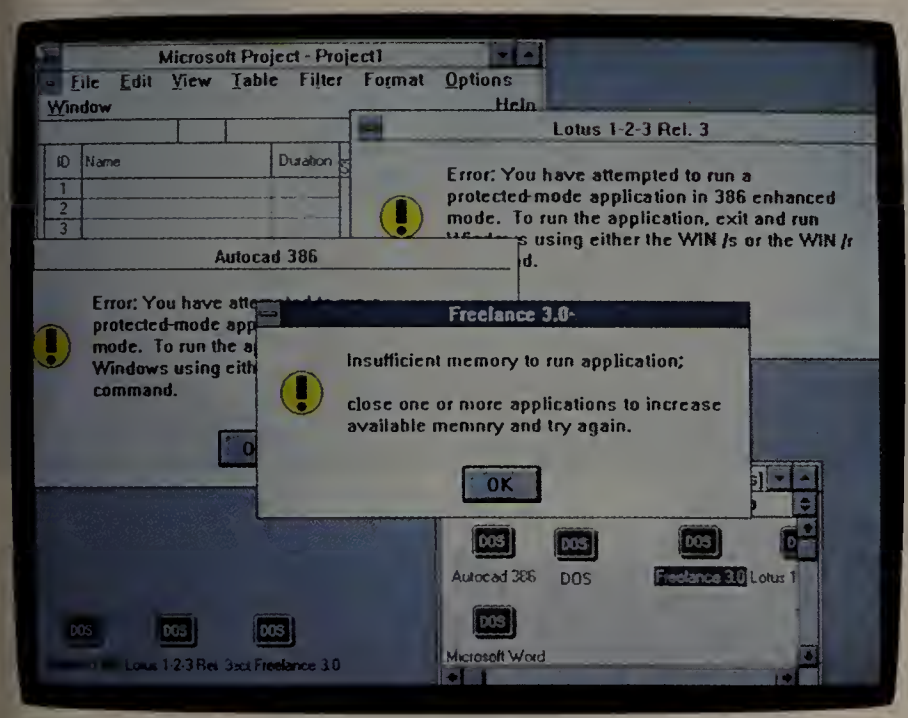
By default, *WordPerfect* merges to the editing screen, from which letters can be viewed, edited, and printed. But when you do the real merge, sending it to the screen may not be practical. It adds an extra step and, due to memory constraints, may be impossible with a large data file. The solution: Set up your primary file to merge directly to the printer. At the end of CUST_LET.PRI, press <Shift>-<F9>p to insert a {*PAGE OFF*} code. Next, press <Shift>-<F9>m, select {*PRINT*}, and press <Enter>. The figure above shows some sample letters made by merging CUSTOMER.SEC into CUST_LET.PRI.

Using these techniques, you can create mass mailings quickly and effectively. And your customers will realize that your business really cares about them—even when they know it's just a form letter. ●

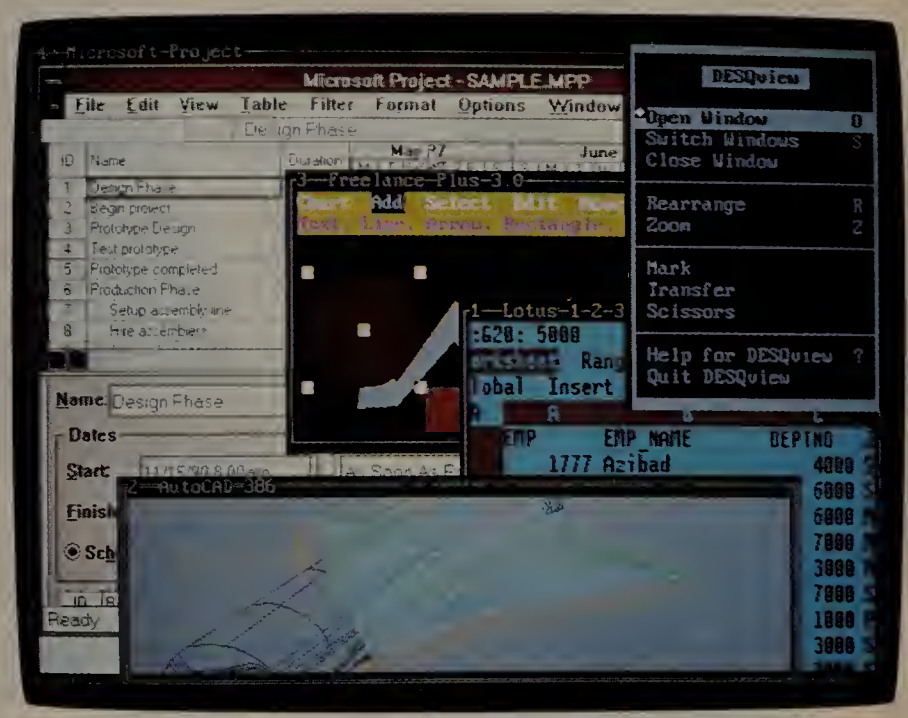
George Campbell is a contributing editor for PC World.

Is Windows 3.0 the end of DESQview™?

Not if you're still using DOS programs.



Windows 3.0. The multitasking, windowing environment.



DESQview 386 2.3. The multitasking, windowing environment.

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This comparison was made using a system like the one you might run: Both shots show an ALR FlexCache 33/386 running DOS 3.3 with VGA display adaptor, Novell NetWare v3.01 Rev. A, with IPX/SPX v3.01 Rev A, Microsoft Mouse 7.00, and Microsoft SMARTDrive v3.03 disk cache. Buffers were set to 20. For the Windows screen, we ran Microsoft Windows 3 HIMEM.SYS and EMM386.SYS. For the DESQview screen, we ran QEMM 386 v5.1.

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If WordPerfect® 5.1 were there, maybe his peers could have grasped the gravity of the situation.

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Now Newton could take an idea like his Law of Universal Gravitation and give it more weight. What's more, using intuitive commands from the 5.1 equation editor palette, he could quickly write a number of variations on the theme.

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Words Into Print

Word Processing

Tips for getting the most out of your word processor

This month: Open long documents with index and table of contents generators, plus special indexing tips for Word and WordPerfect.

George Campbell

A long document without a table of contents (TOC) and an index is like a library with no card catalog. The information is there, but you may never find it. Compiling a TOC or an index was once a terrible chore, but today's word processors make it fairly easy. Here are some tips to make it even easier.

Every document longer than about 20 pages needs a table of contents that lists page numbers for chapters and sections. To create a TOC, scroll through the document and mark the text you want to refer to, such as chapter headings, section titles, and subtitles. Then generate the TOC document, and start formatting. Place chapter titles at the left margin, then indent section titles and subtitles as in an outline. Three levels are plenty. Set page numbers flush with the right margin, with leader dots to guide the eye.

To create an index, start with the TOC entries. (In most programs, you have to mark the words only once, but you still must assign the words to the TOC and the index separately.) Then add special terms and jargon, key concepts, abbreviations and acronyms, and names of people and places. Invert names, as in *Jones, Jim,* and index only significant occurrences of a word, not every one.

You can also build an index from a list of words called a concordance. Marking every occurrence of a keyword in a document takes time, but build a list of words to be indexed throughout the file, and you can skip the marking. A concordance is particularly helpful if you use a similar list of indexed words in all your long documents. Your word processor will index the listed words, plus any that you mark.

An index often has more than one level, with subheadings identified by indentations. In an employee manual, for example, you might list *salary, vacation,* and *sick leave* under *Policies*. Two levels are usually enough; any more will be confusing.

In an index, page numbers normally follow the entry closely and are separated by a comma and, for a range of pages, joined by a dash. A two- or three-column layout compresses the index and minimizes page turning.

With these basic principles in mind, here are the steps used in *WordPerfect 5.0* and *5.1* to create an index and a TOC. Other word processors have similar tools.

WORDPERFECT SHORTCUT

Index Concordance Macro

This macro streamlines the process of adding text to a *WordPerfect* concordance file. You can then generate an index from the concordance and save the file to index future documents. To record the macro, start *WordPerfect,* type a word or two, then follow these steps:

1. Use **<Alt>-<F4>** to block any word on the screen.
2. Press **<Ctrl>-<F10>** to begin recording the macro.
3. Press **<Alt>-I**, type **Concordance**, then press **<Enter>**.
4. Press **<Ctrl>-<F4>bc <Shift>-<F3><Enter>**.
5. Press **<Home><Home> <Cursor Right><Enter><Shift>-<F3>**.
6. To finish recording the macro, press **<Ctrl>-<F10>**.

To use the macro in a document, block a keyword, then press **<Alt>-I**; repeat as needed. When you've finished adding to the concordance file, press **<Shift>-<F3>**, and press **<F10>** to save the concordance with its own file name. To add to the list in a later session, press **<Shift>-<F3>** to switch screens, then load the concordance file, and press **<Shift>-<F3>** to switch to the main document before running the macro. —*G. C.*

PC Help Is Only a Phone Call Away

PC World Paradox 3.5 Power Programming Techniques

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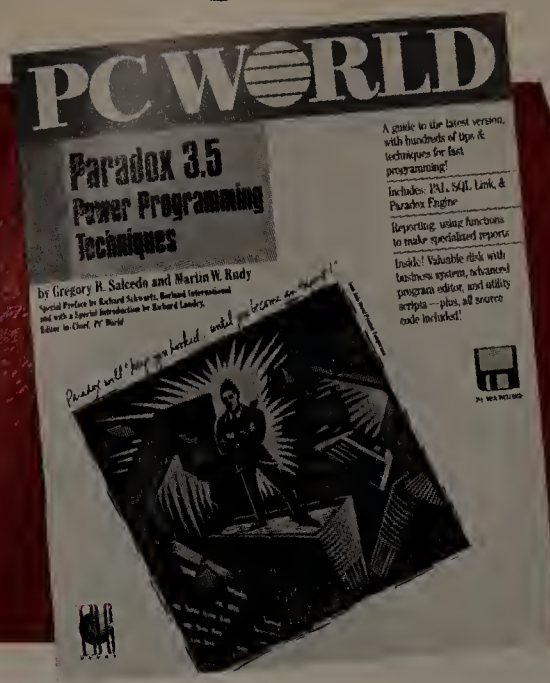

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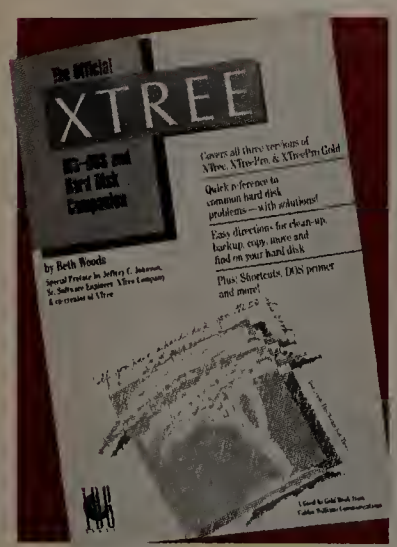

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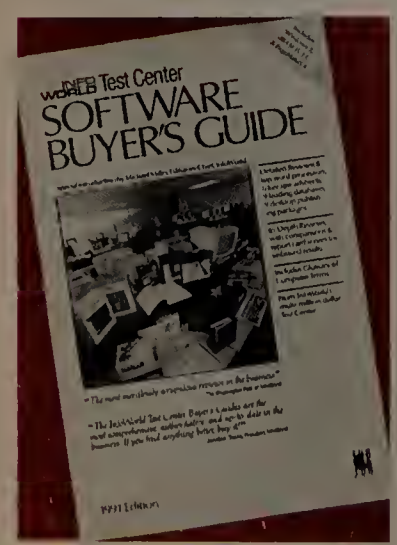

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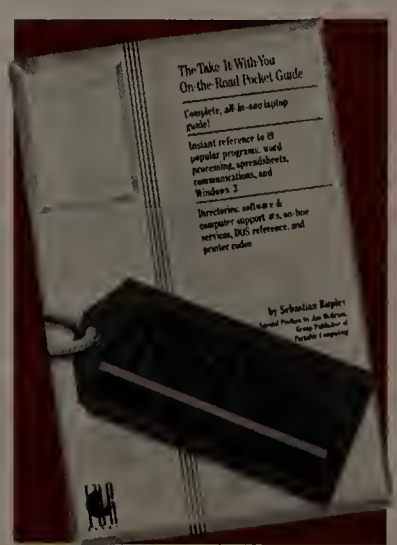

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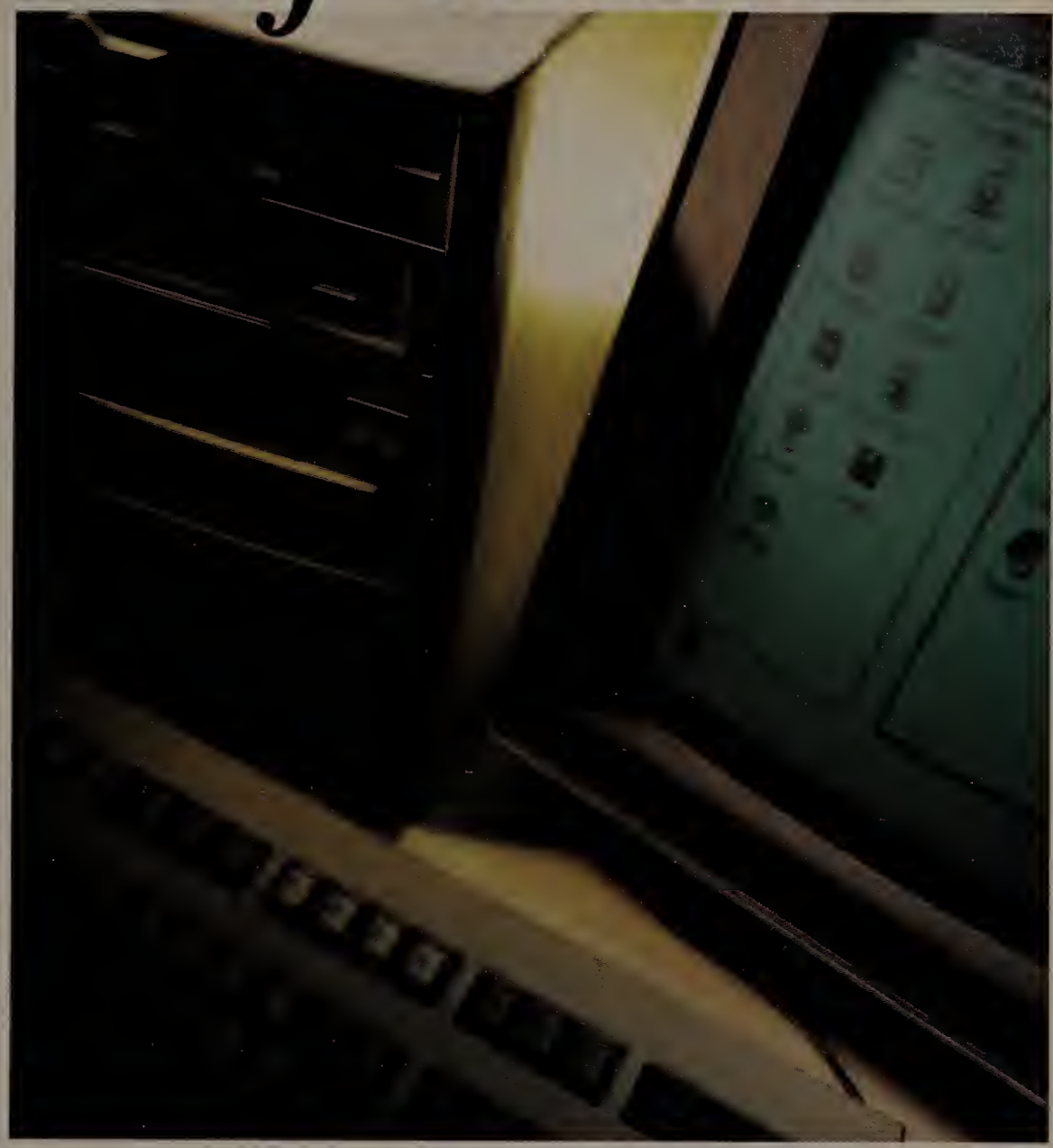

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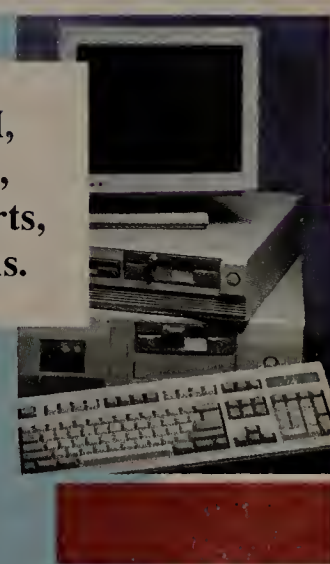

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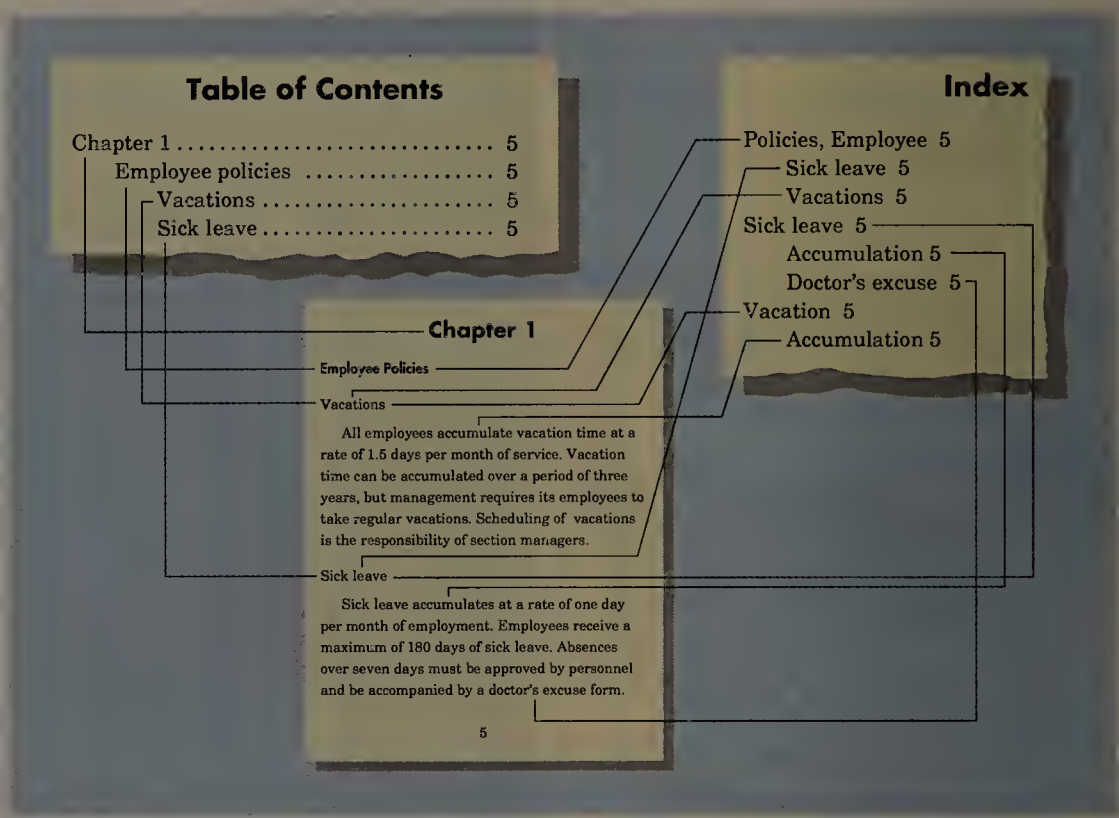

Table of contents entries are listed in the same order as in the document, but index entries are alphabetical. Both use outline-style indentation.

TOCs in WordPerfect

Creating the TOC involves four steps:

1. To mark entries for the TOC, use the <Alt>-<F4> block command or your mouse to highlight the text. Then press <Alt>-<F5>c, type an indentation level from 1 to 5, and press <Enter>. Repeat for each entry.

2. After marking all entries, press <Home><Home><Cursor Up><Ctrl>-<Enter><Cursor Up> to create a blank page for the TOC at the top of the file.

3. To define the table, press <Alt>-<F5>dc. Press 1, then enter the highest indentation level you need. The remaining menu items control text wrapping and number formats. The defaults are usually fine, so press <Enter>.

4. To generate the TOC, press <Alt>-<F5>ggy. Use the usual *WordPerfect* tools to edit or format the resulting table. If you add entries later, you'll have to regenerate the TOC, losing your formatting, so format just before printing.

Indexing With WordPerfect

Creating an index is a similar process:

1. To mark an index entry, first block the text, then press <Alt>-<F5>i. At the *Index heading:* prompt, you'll see the blocked text. Usually, you'll accept it by pressing <Enter>, and you'll normally press <Enter> again at the blank *Subheading:* prompt.

However, if you're inverting a name or adding subheadings, you'll need to answer these prompts. To invert *Jim Johnson,* enter Johnson, Jim at the first prompt. At the second prompt, delete the proposed *Jim Johnson* to avoid creating an unwanted subheading.

To make the marked text *Vacation* a subheading under *Policies,* type Policies at the first prompt, press <Enter>, then press <Enter> again at the second prompt to accept *Vacation.* To create an entry without corresponding marked text, type new text at both prompts.

2. After marking all entries, press <Home><Home><Cursor Down><Ctrl>-<Enter> to add a blank page to the end of the document.

3. To define the index, press <Alt>-<F5>di and <Enter>. If you have a concordance file, enter the file name before pressing <Enter>.

4. Next you'll see a menu for setting the numbering style. The default of right-justified numbers with leaders wastes space. Press 2 to set numbers following the entries.

5. To generate the index, press <Alt>-<F5>ggy. *WordPerfect* will order the concordance file plus all marked entries. Repeat this step if you make any changes to your document.

George Campbell is a contributing editor for PC World.

WORD SHORTCUT

Index and Table of Contents Macros

Word 4.0 and *5.0* come with macros for marking index and table of contents entries. To load the macros, press <Esc>tgl, type macro, and press <Enter> (*Word 4.0* users press <Esc>tgm instead). You may have to include path information for the file, which is normally in the main *Word* directory.

To mark an index entry, highlight the text to be marked, then press <Ctrl>-IE. To mark a highlighted table of contents entry, press <Ctrl>-TE.

Another macro lets you create an index from a concordance file. To use this macro, press <Ctrl>-IW, type the concordance's file name, and press <Enter>. *Word* will compile the index, listing all words in the concordance file plus previously marked entries. —*G. C.*

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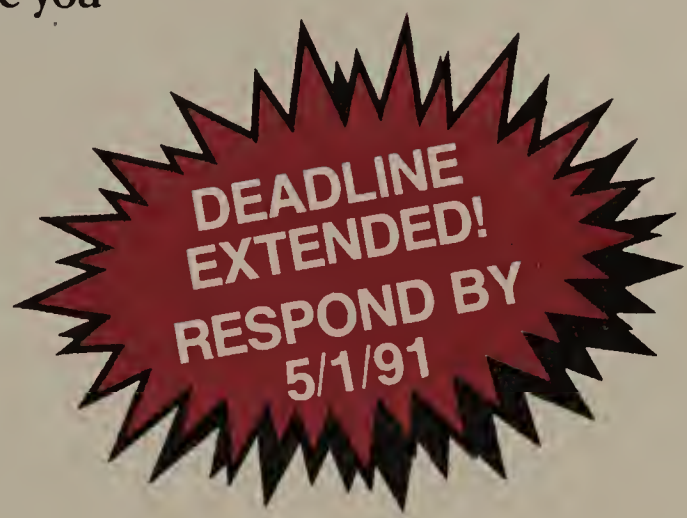

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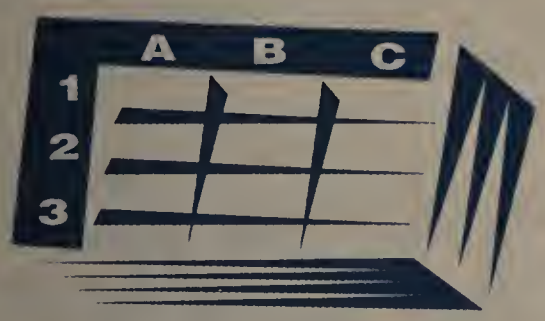


Spreadsheets

Practical tips for building better worksheets

This month: talking graphs

Richard Scoville

In my last column, we explored the basics of *1-2-3 2.x* graphs. Now let's try some graphing tricks that help you make a point even more forcefully.

The graph shown in **FIGURE 1** uses data labels to add text and lines to a graph. Data labels are cell entries assigned to specific data points in the graph. In last month's column, we used them to display data values on a bar chart; here we'll use them to create a variety of special effects.

To set up the basic graph, which illustrates the average number of defective items per 100,000 items that are produced by a company called Fisbo, enter the labels and values shown at the bottom of **FIGURE 1** in columns A and B of an empty worksheet.

Using */Range Name Create*, define the range names MONTHS as A3..A14 and REJECTS as B3..B14, as shown in the figure at E15..F21. Select */Graph Type Line* to choose a line graph, then choose *X*, press <**F3**>, highlight *MONTHS*, and press <**Enter**> to set the *x*-axis labels. Select *A*, press <**F3**>, and select *REJECTS* as the first data range. Using the menu selections under *Options Titles*, enter the First, Second, and *x*- and *y*-axis graph titles as shown in the graph, then select *Quit* to return to the Graph menu. Select *View*, and you'll see just a bare line graph.

That's What I Call a Mean Line

Now, let's add the line in the middle of the graph that denotes the annual mean of the values in column B. The actual line is formed by the data labels (=======) in column D. The result of the formulas in column C (50.8) determines the vertical position of the line.

To set up the line, go back to the worksheet and enter the formula **@avg($REJECTS)** in cell C3, then copy it into the range C4..C14. Then enter all the labels shown in D1..D14. (Do not use the fill command, \, to enter the =======.) In cell D9, enter the formula **+C9** to display the average as one of the data labels. Define the range names MEAN as C3..C14 and MEAN_LABELS as D3..D14, as shown in the range name figure.

Now select */Graph B*, press <**F3**>, and select *MEAN*. Select *Options Data-Labels B*, press <**F3**>, and select *MEAN_LABELS*. Select *Center Quit* to position the label on the data point. Now choose *Format B Neither Quit*. This hides column C's data points, leaving only the data labels on the graph. Select *Quit Quit* to return to the worksheet.

Take Some Notes

Next, we'll add the notes at the upper left and lower right corners of the graph. Once again, we'll position the notes with a dummy data range and add the actual text with data labels. Enter

EXCEL SHORTCUT

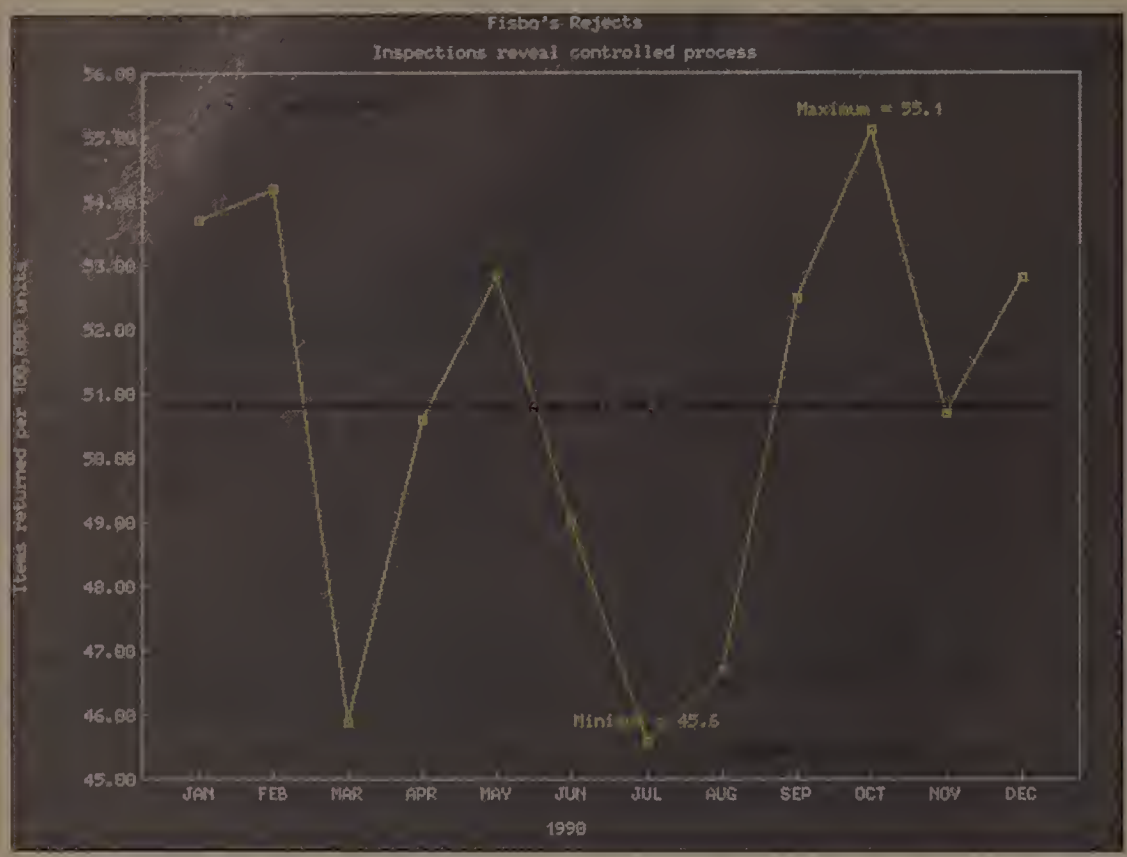
Streamline Excel Macros With Subroutines

Ralph Soucie

Often a macro must repeat the same series of commands over and over. It's easier and more efficient to make those commands a subroutine—a macro within a macro.

Here's a simple example. Suppose you want your macro to format several selected columns as percentages. First, use */File New Macro sheet* and choose an out-of-the-way area—in this example we'll start at cell A100. To name the subroutine, enter **FormatPercent()** in cell A100, select *Formula Define name*, click on *Command*, and press <**Enter**>. Type **=select("c")** in cell A101 and **=format.number("0.00%")** in cell A102. End the subroutine by entering **=return()** in cell A103.

Now, wherever you want a macro to apply the percentage format to the current column in your worksheet, simply use the formula **=FormatPercent()** in that macro.



	A	B	C	D	E	F	G
1				Mean	Min-Max	Note	Note
2		Reject	Mean	Labels	Labels	Values	Labels
3	JAN	53.7	50.8	=======		55.5	* 5 yr. mean = 49.7
4	FEB	54.2	50.8	=======			
5	MAR	45.9	50.8	=======			
6	APR	50.6	50.8	=======			
7	MAY	52.8	50.8	Year			
8	JUN	49.0	50.8	Average:			
9	JUL	45.6	50.8	50.8	Minimum = 45.6		
10	AUG	46.7	50.8	=======		45.5	Source: M.S., Inc.
11	SEP	52.5	50.8	=======			
12	OCT	55.1	50.8	=======	Maximum = 55.1		
13	NOV	50.7	50.8	=======			
14	DEC	52.8	50.8	=======			
15					MEAN	C3..C14	
16					MEAN_LABELS	D3..D14	
17					MINMAX	E3..E14	
18					MONTHS	A3..A14	
19					NOTE_LABELS	G3..G14	
20					NOTE_VALUES	F3..F14	
21					REJECTS	B3..B14	

FIGURE 1: Using data labels in a graph helps amplify the raw numbers—and gets your message across more forcefully. Use the data in the worksheet to create the graph shown above.

the values and labels shown in columns F and G. Define the range names NOTE_LABELS as G3..G14 and NOTE_VALUES as F3..F14.

Then select */Graph F*, press <**F3**>, and select *NOTE_VALUES*. Select *Options Data-Labels F*, press <**F3**>, and select *NOTE_LABELS*. Select *Right Quit* to position the label to the right of the data point. Now choose *Format B Neither Quit*. By changing the values in column F, you can adjust the vertical placement of the text; by moving a label to a different row, you can adjust it horizontally. Select *Quit Quit* to return to the worksheet.

Create Floating Labels

Finally, type the labels as shown into cells E1..E2, and enter the following formula into cell E3 to set up both the minimum and maximum data labels shown on the graph: **@IF(B3 = @MAX(B3..B14), "Maximum = " & @STRING(B3,1), @IF(B3=@MIN(B3..B14), "Minimum = " &@STRING(B3,1),""))**. Copy the formula into the range E3..E14. This conditional formula displays a value in column E only when the adjacent value in column B is the minimum or maximum yearly value. Finally, define the range name MINMAX as E3..E14.

Select */Graph Options Data-Labels A*, press <**F3**>, and select *MINMAX*. Select *Above Quit Quit*, and view your creation. Try changing the data values in column B, and watch the MINMAX labels track the minimum and maximum values. Last but not least, document your work by creating the range name table shown in the worksheet: Select *Range Name Table*, and enter **E15**.

Graphs are the most effective way to summarize a complex quantitative message for a busy audience. Make the most of them, and use data labels to make them even more effective.

Richard Scoville and Ralph Soucie are contributing editors for PC World.

POWER TIP NO. 167

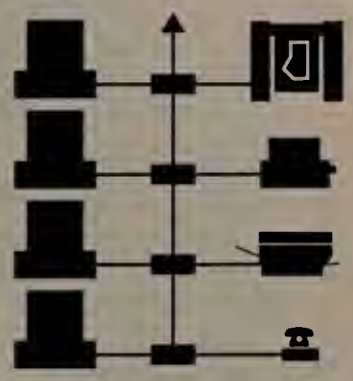
Run Programs Full Screen Under Desqview

If you want an application to always open full screen in Desqview, take these steps: In the Change a Program Advanced Options screen, give the program a 'Starting Height' of **25**, a 'Starting Width' of **80**, and both a 'Starting Row' and 'Starting Column' of **0**. Now when you launch the application, it will run full screen.

Lincoln Spector
Assistant Editor

A full-blown server-based network costs a bundle when done right. Add to this the cost of training and ongoing support (sometimes 2 to 3 times the original investment). Undaunted, businesses bite the bullet every day—effectively turning over their entire computer operations to a LAN expert forever. But many, in seeking a less costly alternative, fall into the trap of false economy.

We say "neither is necessary." Why? How?



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Connectivity and networking solutions abound. Traps of all kinds abound also. Unless you're a teflon-coated decision maker (or a job hopper), the solution you choose today should remain appropriate tomorrow. Let's look at where you can go wrong—and right.

First, there are printer sharing boxes—seemingly hundreds of them. They're a fine short-term solution when you have two or three computers that occasionally need access to a single printer. But when applied to more extensive or demanding applications, they become a *bottleneck*, breed unhappy users and managers, and are a *dead-end*... simply put: the "F word" (*False* economy).

Definition of a bottleneck: a printer sharing box—driven by a single microprocessor—receiving print data from several computers, while it is simultaneously supposed to send this data to several printers. Definition of unhappy users: people who have sent their data to said printer sharing box and subsequently lost their data because somebody reset or turned off the box. Definition of unhappy management: said box has died and *nobody* can print. Definition of dead-end (as opposed to dead box): the fact that a printer sharing box has a finite assortment of inputs and outputs. Bottom line: false economy, because printer sharing boxes can impede and frustrate users, and are too quickly outgrown.

If not printer sharing boxes, then there are networks (LANs). They're a hot item nowadays. LAN dealers invite you for a free analysis of your networking "needs". Sure, they'll *help* you—while they help *themselves* to your bank account. Good networks are EXPENSIVE, and require expert support forever! You will always be accountable to the LAN, like a State and Federal sales tax on every change or addition you make related to your computers.

There *are* inexpensive networks available. There are lots of other inexpensive things in this world. But, would you build your business around them? Cheapo networks tend to teach harsh lessons in false economy and, sometimes, false advertising—resulting in NO economy!

You see, some low-cost LANs claim they occupy very little memory (RAM), yet to realistically accomplish what the LAN is supposed to do, they use as much or more RAM as any other LAN. The truth is, all LANs will occupy a substantial amount of RAM. You often find yourself either having to add RAM (if you can)—and memory management software, or dumping some of your other software overboard.

The lesson in false economy comes later, when you buy a multi-user software package and discover it is intended for use on a server-based data-sharing LAN— usually Novell®. Oops. Old LAN overboard!

Want to avoid such harsh lessons? Rule number one: if and when your company has some computer users who need a data-sharing network—so they can simultaneously access a shared database—get the best network money can buy. Buy UPSs, tape backups, the works. Make the commitment. It's a big step, but you'll regret anything less.

It's highly unlikely however that ALL your computer users need or will ever need access to a shared database. Most probably just need to share printers and other peripherals like plotters, modems and fax machines. And perhaps everyone would like to exchange E-Mail and maybe even pass data files between PCs electronically.

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Data Basics

Data Management

Tips and techniques for managing your data

This month: Band-Aids for reports

Alan Schwartz

The band-oriented report writers found in the latest data managers are proving popular among both techies and novices. You can achieve flexible report layouts without programming, and the interface is similar from product to product.

Programs such as *dBASE IV, Paradox, FoxPro, DataEase,* and *Alpha 4* have all struck up the band. This month we help you get the most out of any band-oriented report writer and offer a few tips for *dBASE IV.*

Band on the Run

It's easy to build multiline detail reports using a band-oriented system. First, orient your eye to the visual cues. The main report screen divides the workspace horizontally into areas corresponding to the report's subdivisions (bands). Usually, there are five bands: a title (which appears only once at the top), page headers, detail lines (the bulk of the report), a footer, and summary lines (home to totals, item counts, and other extras).

The various bands are labeled at the left of the screen, and in many products they're shaded for easier identification. In many systems, a status flag indicates the zone where the cursor is located.

Usually, the default blank report form offers only one detail line, but it's a snap to add more. A report on Acme Home and Garden Tool Rental's customers, for example, requires stretching the height of the detail band to accommodate an address block below each name (see **SCREEN 1**). You'll need five lines, since you'll be drawing a box around each name-and-address block. Just place the cursor anywhere on the detail band, pick the menu option for adding lines, and follow the prompts. A shortcut for adding lines in *dBASE IV* or *Paradox:* Move the cursor into the detail band, and press <**Enter**>.

Next, place the cursor near the left margin of the second detail line, and select your program's Field command. Using the point-and-shoot file selector that appears, select the appropriate field from the available data files. The field you pick will appear on the detail band. In most programs, the field shows as a block of *X*'s.

To move the field, use the cursor keys. In *dBASE IV,* for example, you'd move the cursor into the field, select the field with <**F6**>, move the cursor to the destination, then press <**F7**>. To delete a field, select it with <**F6**>, then press <**Delete**>.

PARADOX SHORTCUT

Pick Your Own Editor

Celeste Robinson

If you don't like *Paradox*'s Script Editor, you can assign another ASCII text editor, such as *Brief* or *Word,* to run in *Paradox.* First, make sure the editor's directory is referenced in your system's PATH command. Then, from *Paradox*'s main menu, select *Script Play,* type **custom**, press <**Enter**>, and answer the prompt about your monitor. From the subsequent menu, choose *Pal Editor.*

Type the name of the executable file that invokes your text editor, and follow it with a space and an asterisk. The asterisk indicates that you want whatever script file is loaded when you invoke the editor. Also, you can put an exclamation point before the editor's file name to give the editor more memory, and/or you can add another space and two more asterisks to the end of the line if your editor can accept a line number that jumps you to that position in the script.

To exit, press <**Enter**>, select *Return Do-it! Do-it!,* and save the CFG file to either *Harddisk* or *Network. Paradox* will close. The next time you load it, *Script Play* will summon your favorite editor.

Adding Text and Boxes in dBASE IV

Once you've attached the fields to the report, you'll need to add various display elements. Free text is the easiest element to place: Just move the cursor where you want the words to be, and start typing.

If you want to move a block of text, you must first mark it. To do this in *dBASE IV* (and most of the other programs), simply move the cursor across the words, and press <**Enter**>. Then move the block just as you would a field. To edit display text, move the cursor onto the text block, select the object (<**F6**> in *dBASE IV*), and edit away. In the Acme example, you would type **Customer Name and Address** in the page header band.

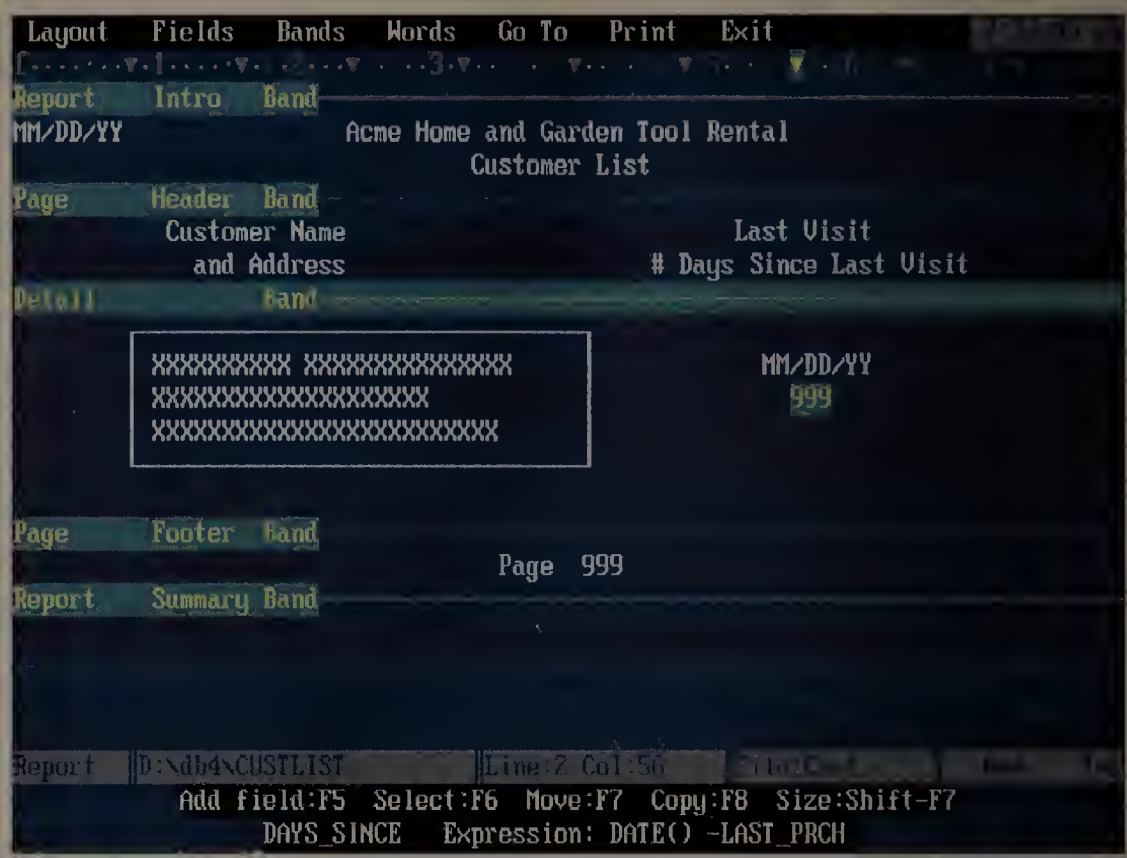
It's just as easy to place boxes or lines in the report. Here's how you would create the boxes for the Acme report using *dBASE IV*—the process is similar in other band-oriented programs.

1. Open the Layout menu, select *Box*, and then pick either *Single line* or *Double line.*

2. Place the cursor at the box's upper left corner, in this case above and to the left of the name field, and press <**Enter**>.

3. Move the cursor to the lower right of the ZIP code, and press <**Enter**> again. You're boxed!

4. To adjust or move the box, place the cursor in the box, press <**F6**> and <**Enter**> to select it, move the cursor, and press <**F7**>.



SCREEN 1: dBASE IV's report writer is one of the best of a crop of new band-oriented report generators that let you format a wide variety of reports without programming.

Calculated Fields

Sometimes you'll want to include a calculated field in your report. For example, you may want to display the number of days since each customer was last in the store or the total dollar amount of rentals this year. To create a display field calculated from data in the file, select your program's menu option for creating a new field. In *dBASE IV*, you'll get a four-column pick list. Select *Create* under Calculated, and move through the menus to the Expression section. Enter **DATE() - LAST_PURCH** as the expression, and set the template to **999**.

Finally, make frequent use of page preview. In *dBASE IV*, it's the *View report on screen* option in the Print menu. This quick visual feedback will keep you on the right track, and it saves trees in the process.

Alan Schwartz is a contributing editor for PC World. *Celeste Robinson is the author of* The Best Book of Paradox *(Howard Sams and Co., Carmel, Indiana, 1990).*

dBASE SHORTCUT

It's a Wrap: Multiline Reports in dBASE

Still stuck with an old *dBASE III Plus* or *Foxbase* report writer? It may seem impossible to build a multiline report as shown in **SCREEN 1**, but it's not. Here's a trick.

Placing a semicolon within the column contents will wrap the column to the next line. This lets you load a multiline group of expressions, such as a three-line address block, into a single column. To do this, enter the column contents, such as the following, into a single column.

TRIM(FNAME) + " " + TRIM(LNAME) + ";" + ADDRESS + ";" + TRIM(CITY) + " " + STATE + " " + ZIP

Set the column width no narrower than the widest possible combination of data appearing between the semicolons—otherwise you'll get unintended word-wrap effects.

Unfortunately, there's no easy way to box an address. For that, you'll have to upgrade to *dBASE IV* or *FoxPro.* —*A. S.*

Here's what they're saying about Ami Pro from Lotus.

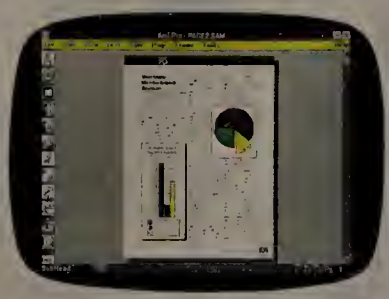
"Independent User Survey For Windows.™*"

Word Processing Features	Ami Pro *for Windows*	Word for Windows	WordPerfect for DOS
Best Overall	50%	22%	16%
Ease of Learning	47%	28%	8%
Ease of Use	52%	23%	8%

*Independently commissioned Windows word processor Usage and Attitude Study conducted November 1990

Circle 324 on reader service card

Here's why th

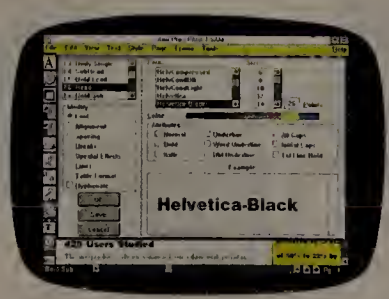


WYSIWYG

No wonder Ami Pro™ for Windows™ is getting rave reviews from users. They're naturally impressed by its 360 powerful features. And even more impressed with how easy it is to use them. Ami Pro has everything you expect in a power word processor, plus important features you can't find anywhere else—like truly interactive WYSIWYG that lets you edit in any of four page views, including full-page view.*

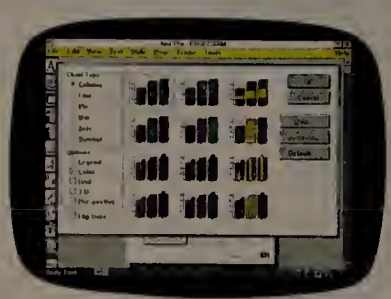
FRAMES

Our exclusive "frames" feature lets you quickly place text and graphic elements where you want. Just position your frame anywhere on the page, then fill it with words, drawings or imported graphics. With a click of the mouse, your text automatically wraps around it.



DIALOG BOXES

Why settle for difficult programs that produce boring documents? Our friendly, interactive Dialog Boxes display all your layout options—and show you the results of commands before you execute them. So you can change your mind without wasting time.



CHARTS AND GRAPHS

In addition to a built-in drawing feature, Ami Pro instantly generates 168 varieties of presentation-quality charts and graphs, including 2-D, 3-D and perspective. Just type in the data, or import your chart information from programs like Lotus® 1-2-3.®

BRS

M E M O R A

To: Lotus Development Word Processing

From: BRS Research Services, Inc.

5, 1990

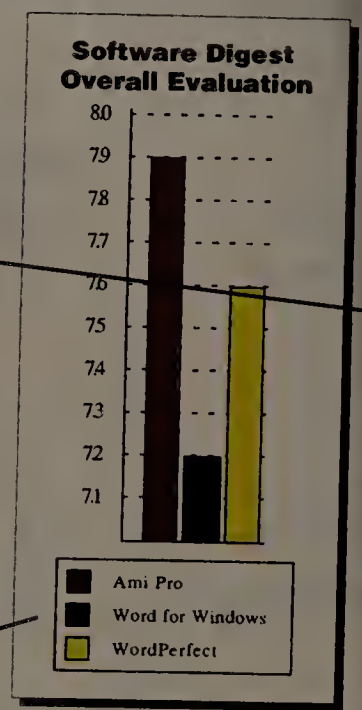
BRS

User Study Matches Expert Reviews

User preference research findings have a uncanny resemblance to what word processing and technology experts have been saying all along: Ami Pro is the new standard for word processing in the Windows environment.

The Software Digest rating, for example, places Ami Pro well above Microsoft's Word for Windows and WordPerfect in terms of overall performance.

The user research shows similar results. Ami Pro consistently outranked Word for Windows and WordPerfect in terms of



BRS

USER P
WORD PR

Executive Sum

Key findings:
Ami Pro preferred 2 to 1

Users prefer Ami Pro from Lo
more than 2 to 1 over Micro
Word for Windows and Wor

Half of the users studied rank
Ami Pro as the "Best Overall
Windows word processor an
overall word processing prod
51.9% said Ami Pro was eas
than Word for Windows an
WordPerfect; 47.3% said it
easiest to learn.

A whopping 63% said they
extremely enthusiastic abou
product or like it better tha

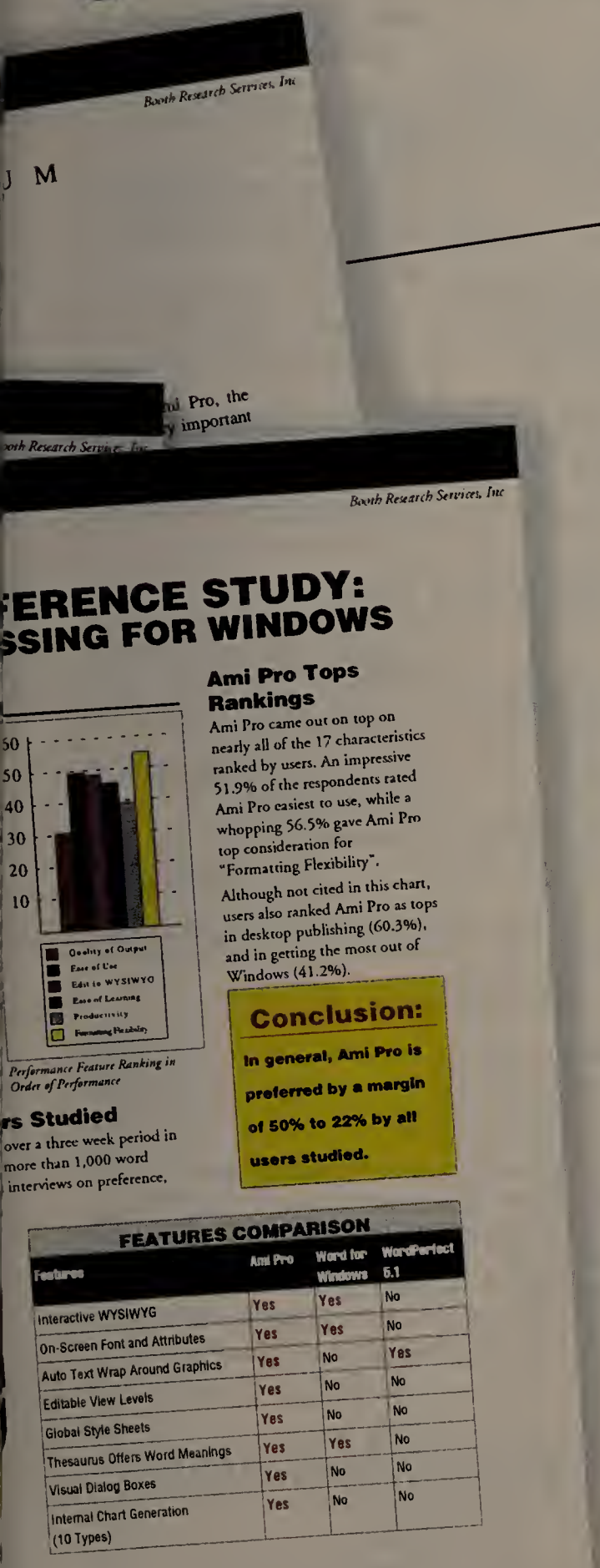
Methodology: 4

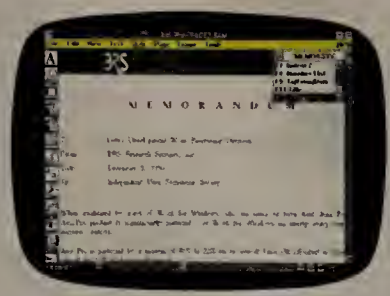
This independent study w
November, 1990. A rando
processing users were calle
attitudes and user experie

Easiest to

*Study results and complete questionnaire available by writing Booth Research Services, Inc., 1120 Hope Road, Suite 200, Atlanta, GA 30350. Enclose $100 plus $3.00 shipping and handling.

ey're saying it.





STYLE SHEETS

Ami Pro comes with more than two dozen style sheets that have the page layout already set up and ready to go. So you can produce professionally designed business letters, memos, reports, presentations, newsletters and more—in just the time it takes to type in text.

EXPERTS AGREE

It's easy to see why users prefer Ami Pro from Lotus two to one over Microsoft® Word for Windows™ for overall features and ease of use. And why it's received top ratings from virtually all the industry experts, racking up such coveted awards as PC World's Best Buy. The Buyers Assurance Seal from InfoWorld. And PC Magazine's Editor's Choice.

"Ami Pro received a score in Ease of Use of the User Interface that was fully 10 points higher than the next highest score, and came in 14 points ahead of the score WordPerfect™ 5.1 drew from its buyers," according to PC Week's Corporate Satisfaction Poll.

PC Magazine says, "Ami Pro has the friendliest interface and the widest range of functions...[It] is easier to use than almost any program with comparable powers."**

Ami Pro is the word processing program that takes full advantage of the Windows environment, combining power word processing with the power to create professional documents fast. And with its icons and interactive features, Ami Pro is incredibly easy to learn and use. So what do you say? You've just learned about five major Ami Pro features.

Now to find out about the other 355—and how to get a great upgrade offer—turn the page.

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This says it all.

Automatic Backup
Automatic Timed Save
Block Manipulation
Bookmarks
• Named By User • Go To
Charting
• 3D Charting • Edit Chart with Draw Tools • Legends • Multiple Styles Per Type • 7 Chart Types
Copy Text and Graphics
Cursor Movement
• Begin/End of File • Character • Line • Page • Paragraph • Sentence • Top/Bottom of Screen • Word
Customizable Icon Bar
• Choose From Over 45 Functions • Quick Access to Features
Customizable View Level
• 10-400% • Fully Editable
Cut and Paste
Date Insertion
• Today's Date • Date Printed • Date Last Edited • Definable Style
DDE (Dynamic Data Exchange)
• Two-way • Paste Link • Text and Graphics • Via Macro Language
Defaults
• Backup Options • Date Styles • Dictionary Paths • Display Options • Document Path • Draft Mode Colors • Footnote Options • Hyphenation Hot Zone • Pair Kerning • Printer • Icon Bar Icons • Undo Levels • View Level
Delete
Dialog Boxes
Document Annotation
• Notes • Show/Hide • Go To Notes • Date/Time Stamp • Stacked Notes
Document Descriptions
• Author Name • Operator Name • Revision Number • Creation Date • Revision Date • Renameable Fields • User Defined Fields • Display with Directory • Print with Document
Drawing
• Cut/Paste Objects • Circles • Arcs • Squares • Rectangles • Rounded Boxes • Diagonals • Polygons • Polylines • Group Objects • Snap-To Grid • Fill Patterns • Line Widths • Text Rotation • Type Text
File Import/Export
• AdvanceWrite • ASCII • DBase • DCA Final Form • DCA Revisable Form • DIF • E-Mail • Enable • Lotus WKS, WK1, WK3 • Microsoft Word • Microsoft Word for Windows • Multimate • Navy DIF • Peachtext • Rich Text Format • Samna Word • Windows Write • WordPerfect • WordStar • Wordstar 2000
File Management Functions
• Copy • Rename • Delete • Move • Sorted File Listing
Font Control
• Unlimited Number of Fonts • WYSIWYG • Limited Only by Printer
Footnotes
• Auto Numbering • Bottom of Page • Endnotes • Number Style Option • Reset Number Option • Separator Line
Forms Capability
• Format Complicated Forms • Fill-In On-Screen • Print on Preprinted Form • Protect Areas
Frames
• Anchor to Text • Auto Text Wrap Around • Background Shade • Contain Text or Graphics • Fixed Position On Page • Lines Around • No Text Wrap Around • No Text Wrap Beside • Overlay Frames • Repeat on Multiple Pages • Resize Frames
Glossary
• Large Record Size • Speed Key Access
Go To
• Any Page Number • Fast Next Item Access • Go To Frame, Footnote, Note, Various Marks in Document
Graphics Control
• Edit PIC Files • Drop Anywhere on Page • Float Graphic w/Text • Place in Box • Proportional Scaling • Fit in Frame • Rotate in Single Degree Steps • X-Y Scaling • Gutter/Binding Margins
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Hard Space
Headers/Footers
• Alternating • Floating
Help
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Hyphenation
• As-You-Type • Soft Hyphen • Consecutive Hyphen Control • On Paragraph Basis • Hot Zone
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Index Generation
• Generate from List • Mark in Text • Multiple Level Indexing • Hyper Links from Index Back into Document
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Kerning
Line Numbering
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Math Calculations
Measurements
• Centimeters • Inches • Picas • Points
Merge
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Page Breaks
• Manually Inserted • With Paragraph Style
Page Formatting Control
• Margins • Page Size • Snaking Columns • Line Around Page • Line Between Columns • Portrait/Landscape
Page Numbers
• Any Location on Page • Reset Page Number • Five Formats for Number
Paragraph Styles
• Quick Access with Styles Box • With Function Key • Controls: Font, Alignment, Spacing, Page Breaks, Ruling Lines, Bullets, Numeric Format in Table, Hyphenation
Printing Color
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Real-Time Pagination
Revert to Saved Version
Search and Replace
• Case Insensitive • Forward or Backward • Header/Footer/Footnote • Skip • Replace • Replace All • Search for Style • Search by Attribute • Wildcards
Section Outline Numbering
• 6 Levels • Number Paragraphs • Numbered Lists • User-Defined Reset
Snaking Columns
• Up to 8 Columns • Column Balancing • On Screen • Variable Width • Variable Spaced
Sort
• Alphabetic • Numeric • Ascending • Descending • By Paragraph • By Word • By Number of Lines • 3 Levels—3 Words Within each Level
Spelling Check
• 130,000 Word Dictionary • Add to Dictionary • Correct Multiple Occurrences • Entire Document • Selected Text • International Dictionaries • Rest of Document • Skip All Occurrences • Statistics Report • Unlimited User Dictionary Size
Status Line
• Column Number • Document Name • Insert/Typeover • Line Number • Page Number
Style Sheets
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• Up to 256 Columns • Column Width Control • Row Height Control • Auto Row Height • Lines around Cells • Shaded Cells • Connected Cells • Formulas: Four-Function Math, Sum Function, Absolute/Relative Cell Address • Insert Rows and Columns • Numeric Alignment and Formatting
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If you're currently using **WordPerfect**,® **Microsoft® Word**, **DisplayWrite**,® **Multimate**,® **WordStar® Professional** or **2000**, **OfficeWriter**,® **Samna® Word IV**™ or **Lotus® Manuscript**,™ call our toll free number to find out how to upgrade by exchanging your cover page or program disk for a copy of Ami Pro at $129.00. It's just that easy.

Ami Pro™ *for Windows*™
from
Lotus®

Lotus Word Processing Division, 5600 Glenridge Drive
Atlanta, GA 30342, 800-831-9679, 404-851-0007

*offer expires April 15, 1991. InfoWorld's Buyers Assurance Seal awarded August 13, 1990 to Ami Pro 1.2.

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The Art of Persuasion

Publishing & Graphics

Expert advice for creating high-impact documents and presentations

This month: capturing attention with captions, and importing caption text into PageMaker and Ventura

Richard Jantz

Be honest: Do *you* read everything that comes across your desk? Most readers skim a document for about two seconds before deciding whether it's worth their time. That puts a heavy burden on headlines and graphics to pull readers into the page.

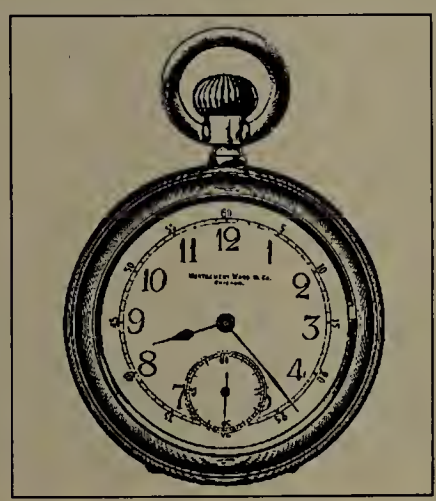
Aside from headlines, the most widely read parts of any publication are the captions that accompany photographs and illustrations. Trouble is, many desktop publishers wait until the last minute to create captions instead of taking the time to integrate them into the document's design. This month, we offer tips on creating attention-grabbing captions for everything from newsletters to technical reports.

A successful caption not only describes a picture but also provides information not found anywhere else in text. Rather than compose it in your desktop publishing program, write it in your word processor—that way you can check spelling and give text the attention it deserves before importing it into your document. (For tips on importing captions, see the sidebar "Nuts & Bolts.")

Once you've written the caption, choose a design that matches the tone of your document, and use it consistently throughout. Here are some tips for formatting captions.

- As a rule, every picture needs a caption. (One exception is *lead art*—a graphic that appears at the beginning of an article.) Although you can lump captions together when several pictures appear on the same page or *spread* (facing pages), they're more effective when

Creating Attention-Grabbing Captions



You can create line art using a paint, illustration, or computer-aided design program, or with a scanner.

Graphics Corner *continued*

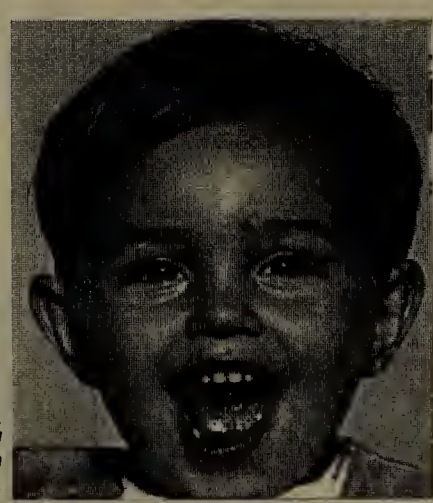
The pictorial images you use in your publications are classified as either *line art* or *continuous-tone art*. Line art is made up of black-and-white elements only, with no gradation of tone, while continuous-tone art can feature a broad range of tones, from black to white with scores of intermediate shades of gray.

Examples of line art include dots, rules, silhouettes, and even the typeset text you are now reading. Examples of continuous-tone art include photographs, paintings, and charcoal drawings.

If you want to digitize line art, virtually any image scanner is capable of producing fine results. To convert continuous-tone art, however, you'll need a *gray-scale* scanner that can record and reproduce up to 256 levels of gray.

Laser Printing Your Image

The difference between a gray-scale and a non-gray-scale image isn't so noticeable when each is output on a 300-dots-per-inch (dpi) laser printer, but when printed on a high-resolution typesetter, capable of producing 1,270 or 2,540 dpi, the difference is quite striking. In some cases, it's almost impossible to see the difference between a computer-produced photo and



Before gray-scale scanners, you needed a conventional halftone in order to print continuous-tone art.

In this sample document, the vertical edge of each caption is linked to the picture's vertical edge. Captions placed on the right side of a picture are aligned flush left, ragged right, while captions on the left are just the opposite. Vertically aligning each caption with the top or bottom of the picture frame helps create a balanced design with plenty of white space.

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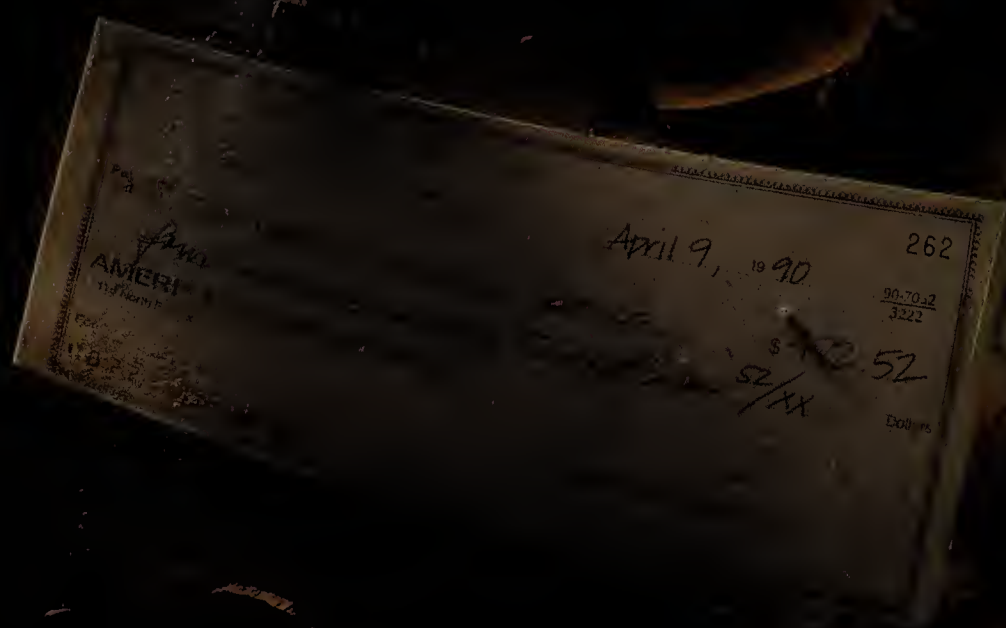
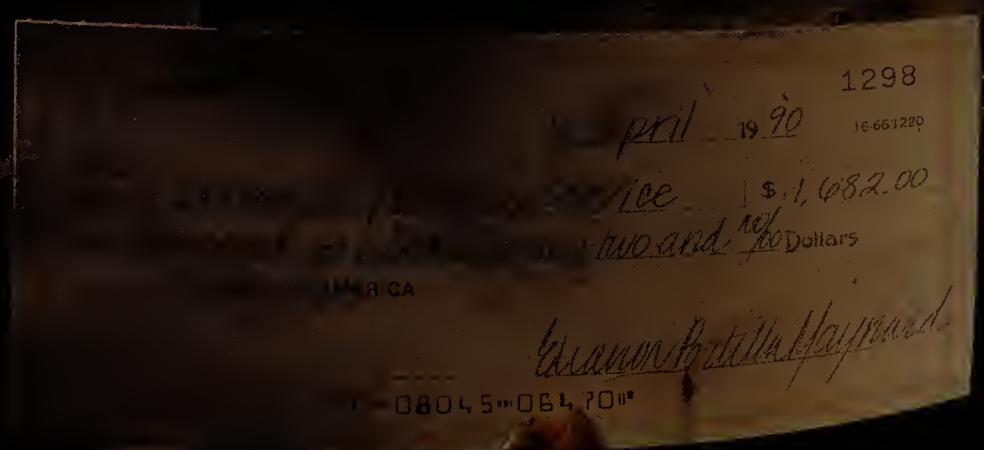
© 1990 ChipSoft, Inc.





WHOEVER SAID IT
THAN TO RECEIVE WAS

It's better to give than to receive, but there comes a point when paying taxes, that even the most generous among us must draw the line.

Say hello to TurboTax.® The tax preparation software for the IBM PC and Macintosh® that's just what you'll need to help you draw that line.

It's the software with quite an impressive track record. It has won the PC Magazine Editor's Choice Award. And the PC World World Class Award for 5 years in a row.

The reason for all the accolades? TurboTax is like having a tax expert hold your hand while you prepare your taxes.

TurboTax comes complete with over 60 easy to understand federal forms, schedules and worksheets. Easy to understand because TurboTax uses a new hypertext help feature to translate tough tax instructions into plain English.

It lets you compare various tax scenarios. Juggle the figures. Move around deductions. Declare a stock loss this year? No, next year would be even better.

TurboTax guides you to the appropriate line, and shows you how to enter over 90 types of income and expenses. It warns you if any of the numbers you're claiming might flag the IRS. It will proof your return in over 250 areas to check for mistakes in logic, calculation, and identify any potential missed savings opportunities.

It's even a math whiz. All the

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Personal/1040 Includes:

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Schedule B ... Interest and Dividend Income
Schedule C (4) ... Business Income and Expenses
Schedule D ... Capital Gains and Losses
Schedule D-Extra ... Additional Capital Gains and Losses
Schedule D-1 ... Continuation Sheet for Schedule D
Schedule E ... Supplemental Income and Loss
Schedule E1 Extra. Additional Rent and Royalty Income
Schedule E2-Extra ... Additional Partnerships, S Corp. Income
Schedule F (2) ... Farm Income and Expenses
Schedule R ... Credit for the Elderly or the Disabled
Schedule SE (2) ... Social Security Self-Employment Tax
Form 2106 (2) ... Employee Business Expenses
Form 2119 ... Sale of Principal Residence
Form 2210 ... Underpayment of Estimated Tax
Form 2441 ... Child and Dependent Care
Form 3800 ... General Business Credit
Form 3903 ... Moving Expense Adjustment
Form 4137(2) ... Social Security Tax on Unreported Tip Income
Form 4255 ... Recapture of Investment Credit
Form 4562 (6) ... Depreciation and Amortization
Form 4684 ... Casualties and Thefts
Form 4797 ... Sales of Business Property
Form 4868 ... Application for Extension of Time to File
Form 4952 ... Investment Interest Expense Deduction
Form 4972 ... Tax on Lump-Sum Distributions
Form 6251 ... Alternative Minimum Tax
Form 6252 (4) ... Installment Sale Income
Form 8283 ... Non-cash Charitable Contributions
Form 8453 ... Declaration for Electronic Filing
Form 8582 ... Passive Activity Loss Limitations
Form 8606 (2) ... Non-deductible IRA Contribution
Form 8615 ... Children under Age 14 Who Have Investment Income
Form 8814 (4) ... Parent's Election to Report Child's Interest and Dividends
Form 8822 ... Change of Address
Form 1040A ... Individual Income Tax Return (Short Form)
Form 1040A-Schedule 1 ... Interest and Dividend Income (Short Form)
Form 1040A-Schedule 2 ... Child and Dependent Care Expenses
Form 1040A-Schedule 3 ... Credit for the Elderly or Disabled
Form 1040 ES ... Estimated Tax Worksheet
W-4 ... Withholding Allowance Certificate
Worksheet ... Automatic Interview, helps to organize
Worksheet ... Personal and Miscellaneous Data
Worksheet ... W-2 Income
Worksheet ... Person Claimed As Dependent
Worksheet ... Taxable Refund of State and Local Income Tax
Worksheet ... Federal Income Tax Carryover Data
Worksheet ... W-2P Annuities, Pensions & IRA Payments
Worksheet ... Form 1099-R Income
Worksheet ... Form 1099-Misc. and Form W-2G
Worksheet ... Depreciation and Amortization
Worksheet ... IRA Calculations
Worksheet ... Social Security Benefits
Worksheet (7) ... Partners K-1
Worksheet (3) ... S Corporation K-1
Worksheet (3) ... Estate/Trust K-1
Worksheet ... Passive Activities
Worksheet ... Tax Rate Schedule
Worksheet ... Self-Employment Tax Deduction
Worksheet ... Child and Dependent Care Credit
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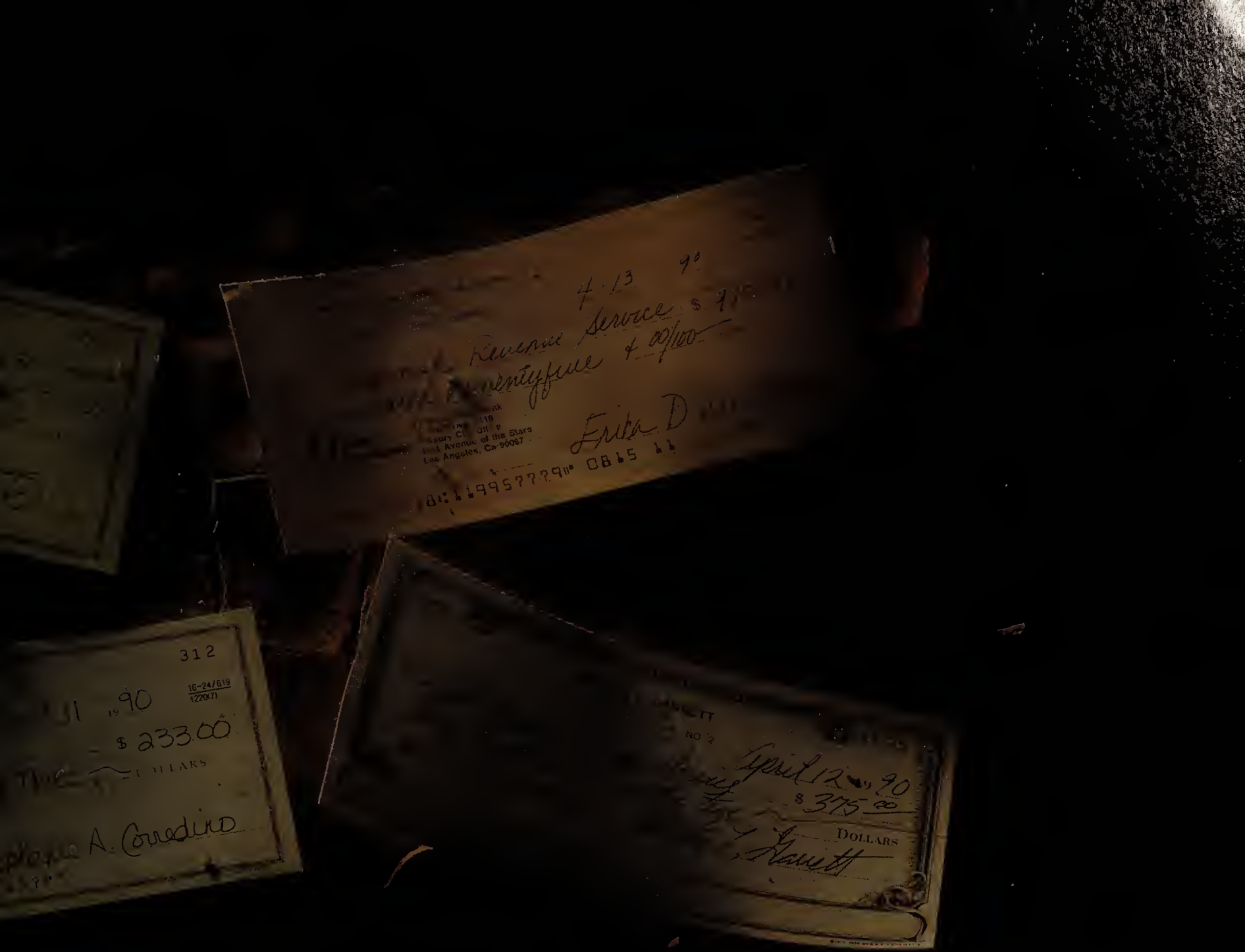

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placed next to the items they describe.

- In general, a caption should appear below the picture in business reports and technical manuals, about a line space (or less) from the bottom edge of the graphic. If the picture appears within columns of text, use a thin rule or at least two line spaces to separate it from body text.
- In newsletters and less formal documents, placement may vary according to the size and shape of the picture. For example, you can place captions above or below landscape (horizontally oriented) pictures, and to the left or right of portrait-style (vertical) graphics. Allow the equivalent of a line space between the side of a vertical picture and the caption.
- Set captions in a slightly smaller point size than body text, using a contrasting typeface, style, or weight. For example, if body text is Times Roman (a *serif*, or more ornate, typeface), set the caption in a simpler *sans serif* face such as Helvetica—or vice versa. If you use roman (normal) style for body text, employ bold, italic, or bold italic for captions.
- As a general rule, set captions flush left with a ragged right margin. (Exceptions can be made with side captions—see the accompanying figure.) Captions shouldn't be indented, centered, or hyphenated.
- Shorter captions are always preferable. But if your captions start to run as long as six or seven lines, consider splitting them into two *legs* (halves, or columns), with at least one pica of white space between them.
- Another way to improve the readability of a multiple-line caption is to add a few points of extra *leading* (line spacing) between the lines.
- If you need to add a *credit line* acknowledging, say, a photographer or illustrator, set it in 6- to 8-point capital letters, and place it vertically (rotated 90 degrees) alongside the picture. (If your printer doesn't support rotated text, you'll have to paste it up manually.) As a rule, the credit line should read from bottom to top when placed on the left, top to bottom on the right.

Remember, while captions are great for hooking readers, they shouldn't dominate your page's text or graphics. A picture is still worth a thousand words, but a few carefully designed words can make your document worth a whole lot more.

Richard Jantz is a contributing editor for PC World.

NUTS & BOLTS

Inserting Captions in Ventura and PageMaker

It's always a good idea to write caption text using your word processor, then import it into your document. Here's how to place caption text inside *PageMaker* and *Ventura* documents.

After you've written and spell-checked your captions, import the text file into the document. In *PageMaker*, simply place the file on the pasteboard, cut each caption, and paste it in place. *Ventura*'s a little trickier: First, you must use the Frame menu's Anchors & Captions option to create an empty caption frame, which automatically links to the picture frame. Then, replace the graphic inside the picture frame with the text file (by clicking on the frame, then on the file name), separate the desired caption, and insert it in the caption frame. Finally, return the graphic to the picture frame. —*R. J.*

DESKTOP PUBLISHING TOOLBOX

A Cure for Ventura's Nagging Codes

One great thing about *Ventura* is that you can use your word processor to edit a document's text files—provided you can wade through the cryptic formatting codes *Ventura* inserts there. Fortunately, there's *VenEdit*, a $195 utility that makes editing these a snap.

VenEdit is a pure ASCII text editor with basic commands like block copy and search and replace, plus a macro capability. Just pull down a menu, load your text file, and select a command to hide all formatting codes. Move the cursor on top of a hidden code, and *VenEdit* displays it at the top of the screen. You can edit existing codes, or use a pulldown menu to insert new codes in a single keystroke.

VenEdit also features a spelling checker and thesaurus, and it allows you to edit six text files at once. If you're suffering from a bad case of *Ventura* codes, try *VenEdit*. —*R. J.*

VenEdit $195; QPlus Inc., 2020 Beechwood Blvd., Pittsburgh, PA 15217; 412/521-9525
Reader service no. 608

The Information Edge

Communications

On-line resources for business and professional users

This month: Track local newspapers via Vu/Text, and search for big-ticket real estate properties with the Robnor Group data bases.

Judy Heim

I once knew a lawyer who subscribed to 100 daily newspapers. He made his money advising corporate clients on political stratagems and needed an encyclopedic knowledge of world affairs. Happily, these days you don't have to kick your way through 75 pounds of newsprint on the doorstep every morning to keep abreast of the news. A subscription to Vu/Text, the largest on-line newspaper collection you'll find in the United States, delivers the full text of 69 U.S. newspapers, a formidable assortment of Canadian and European business journals, and five wire services.

Popular among lawyers, public relations specialists, and journalists, Vu/Text digitizes newspapers from almost every major U.S. city and many medium-sized burgs. In most cases, you can download issues going back two to four years, and some even go back ten years.

While Vu/Text is great for keeping tabs on local news in specific regions of the country, it's *not* good for staying on top of breaking news. Unlike data on NewsNet, which specializes in up-to-the-second wire services, news on Vu/Text may be as much as three days old —typical for newspaper data bases.

For on-line access to newspapers, you have only two primary choices: Vu/Text and its main on-line competitor, DataTimes. Vu/Text is a little cheaper and has a slightly larger collection. Using the basic newspaper collection on Vu/Text for one hour per month will run you about $160, all charges included. If you're willing to pay $250 to $300 an hour, you can also take a look at *Wall Street Transcript.* This popular weekly, found nowhere else on line, contains brokerage reports, plus roundtables with security analysts. Other extra-cost data bases include Profile, which incorporates 60 periodicals on European business, and QL, which covers 300 Canadian publications. Profile is available on DataTimes also, but even with the surcharges it's cheaper on Vu/Text. QL, however, can be accessed much more cheaply directly from QL Systems.

Seventy-five percent of the papers on Vu/Text are available nowhere else on line. However, you can find 16 of them on Dialog, where you can search them in greater detail and at lower cost—if you're willing to contend with Dialog's gnarly interface.

Searching and Clipping

Vu/Text's interface is part menu, part command line, but thanks to a good manual it's fairly easy to use. You enter codes on a command line to define the search. Fortunately, an on-line menu helps you select the codes. You can tell the system which groups of publications or which geographical region to look at, what elements (headlines, lead paragraphs, full text, even descriptions of illustrations) to search, and how you want the matches ("hits") displayed. Finally, you type in the keywords to search for, and the system is off and running. Once a search is complete, you view the hits one at a time; there's no way to scroll through a list of headlines.

Vu/Text includes a clipping service called Vu/Clip, but it's not elegant. Instead of entering keywords on line and logging on the next day to find matching news stories waiting for you, as you do on Dialog, you call Vu/Text's customer service reps and tell them the keywords to track. Then they mail the hits to you, weekly or monthly, for $10 per search, plus 75 cents per page.

Clearly, Vu/Text is not the best choice if you need up-to-the-minute news, but it's well suited for media professionals, public relations consultants, lawyers, and business researchers who must

ON-LINE SHORTCUT

Get Procomm's XMODEM to Relax

Do bungled file transfers over packet networks like Telenet and Tymnet have your nerves in knots? Maybe your XMODEM needs to relax—in other words, to be less dependent on transmission timing. To put *Procomm*'s XMODEM into "relaxed mode," press **<Alt>-SPG** to access the Setup menu's Protocol options, and at 'XMODEM type' press **<Space>**. —*J. H.*

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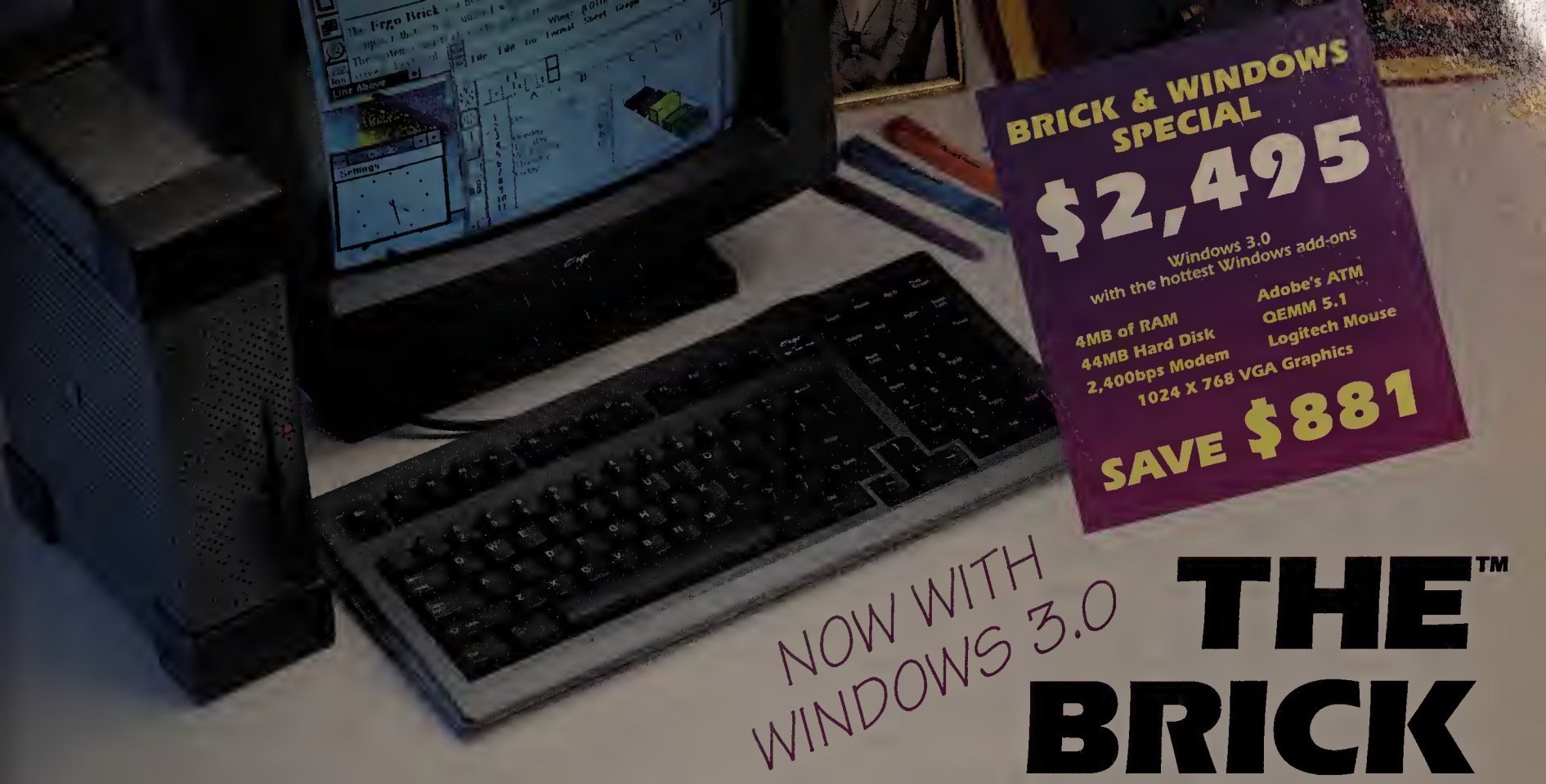

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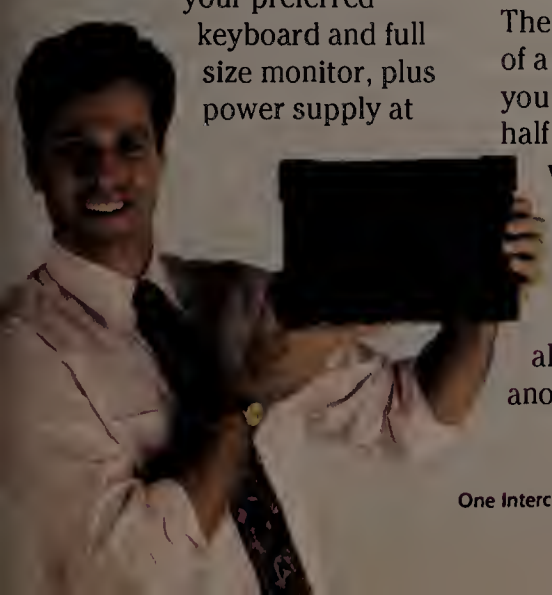
For multisite computing, the Brick offers an alternative to the usual trade-offs of laptops or multiple PC's. Just keep your preferred keyboard and full size monitor, plus power supply at your regular destination and carry only the 8 lb. Brick in between. You'll save half the cost, half the weight and all the hassle of coordinating files between multiple machines.



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Bricks are available with 16 or 20 MHz 386SX, 1-8 MB of RAM, a fast 44, 104 or 212 MB Conner or Teac IDE hard disk, and a 387 coprocessor socket. A 2,400 bps Hayes compatible modem is standard.

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The Brick is only about the size of a ream of copier paper, yet you can still add up to two ISA half cards internally, (one card with a floppy drive). A docking port allows easy, drop-in connection to our Docking Terminal, **$349**, which instantly hooks up all cables and provides another 16-bit 3/4 length slot.

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THE PROFESSIONAL EDGE

Robnor: Unload That $10 Million Chalet

Paula Gilbert

Buyers of megabuck real estate can be harder to find than a cheap high rise in Tokyo. Sources of funding for multimillion-dollar real estate ventures are even tougher to track down. Ordinarily, a real estate agent must thumb through multiple Rolodexes, call up bankers, and rely upon word of mouth for leads.

Fortunately, now you can turn to three unique real estate data bases from the Robnor Group, a specialized real estate and venture funding company. Available on NewsNet and CompuServe, the data bases offer a faster, easier way to track down big-money lenders, deep-pocket buyers, and the properties that bring them together. The data is based on Robnor's extensive files, combined with word-of-mouth tips.

Robnor's Venture Funding Directory is probably the most useful part of the collection. It lists major real estate lenders, their geographic preferences, and minimum and maximum loan amounts. According to Robnor, it contains thousands of listings—although I spotted the same names listed repeatedly.

The Buyers' Directory gives names, addresses, and phone numbers of big-ticket real estate buyers, as well as the syndicates, investors, or mutual funds they buy for. It also lists where the buyers are looking for property and what their price ranges are.

The Seller's Directory covers properties for sale around the world. Commercial and residential properties priced as low as $100,000 *qualify,* but I didn't see anything listed for under $1 million. The directory garners only about 50 new listings a month—not many for an international listing service. The other two data bases don't charge for listings, but the Seller's Directory asks $75 to list a major property for a month.

Finding and searching the data bases is equally easy on both services. On NewsNet, you enter the data base code at the main menu. Once inside, you're prompted for keywords like the state or date to narrow your search. On CompuServe, you type "GO IQUEST," choose the data base from a menu, and search by keyword.

You can access the Robnor data bases on CompuServe for CIS's basic $12.50 connect charge, but you'll also pay $9 for every name or property you look at. You're probably better off on NewsNet, where you pay higher total connect costs ($204 an hour), plus $15 per month for viewing the account, but no fee for data base entries. Since you can search and download hundreds of entries in minutes, you should save money.

While searching the Robnor data bases is faster than the old-fashioned Rolodex method, it may not be worth the money for smaller real estate agents. But for those with $1 million–plus properties to sell, as well as investors looking for high-stakes acquisitions, these listings could be just the thing.

CompuServe Information Service, 5000 Arlington Centre Blvd., P.O. Box 20212, Calumbus, OH 43220; 800/848-8199
Reader service no. 679

NewsNet, Independent Publications, 945 Haverford Rd., Bryn Mawr, PA 19010; 800/345-1301, 215/527-8030
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monitor local issues and happenings around the country.

Judy Heim is a contributing editor for PC World. *Paula Gilbert, a Realtor in Baton Rouge, Louisiana, leads the real estate forum on GEnie.*

For more information about all products in this article, circle reader service no. 903.

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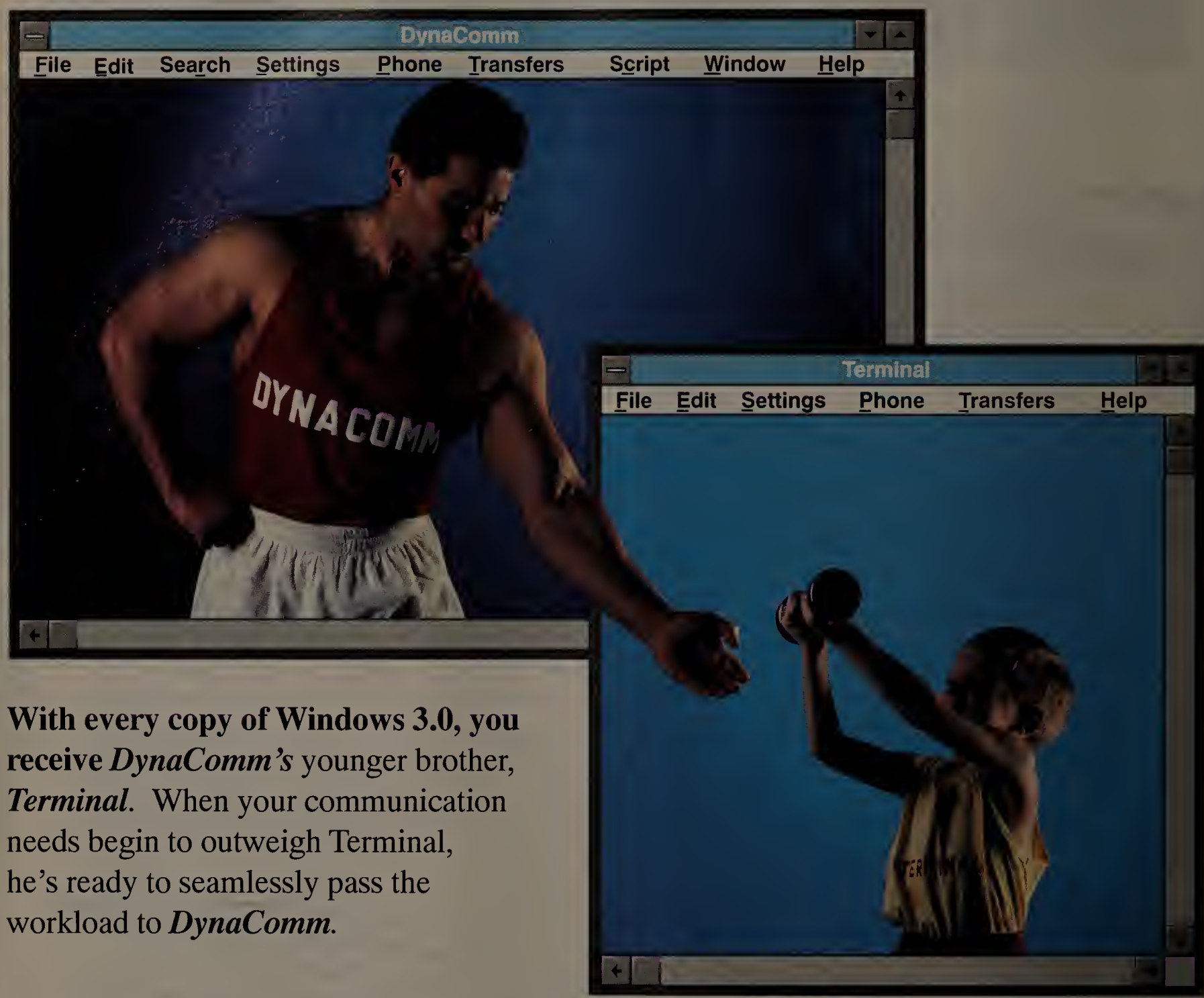

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User Group Tips

Helpful hints from members of the nation's user groups

Taking Just One Turn at BAT

Do you have batch files with commands that should be run only once per session, such as those that initialize your network workstation? With DOS 3.3 and later versions, you can set an environment variable whose value a batch file can check to determine whether or not to run a particular command. Environment variables, often called DOS variables, and their values are stored in an area of memory called the environment. To see what's in it, just enter **set** at the DOS prompt. You'll see PATH and PROMPT settings as well as the setting for COMSPEC, which tells DOS where to find COMMAND.COM. You can add variables to the environment with the SET command until you run out of environment space.

Let's say your AUTOEXEC.BAT file contains commands that initialize your network connection and you want to make sure that they're run only once. Add the line **if %netsw%==yes goto netswset** just before the commands that initialize your workstation. Then add the lines **set netsw=yes** and **:netswset** just after the initialization commands.

The first time AUTOEXEC.BAT runs, the IF test fails (because there is no DOS variable NETSW), and the GOTO command is ignored. Therefore, both the initialization and the SET NETSW=YES commands are executed. If you rerun the batch file, however, IF will execute the GOTO command (assuming, of course, that NETSW is still set to "yes"), which causes the batch file to skip over the initialization and the SET NETSW commands.

Make note of the syntax used: The batch file's IF command requires that any environment variable you're testing be surrounded by percent signs and then followed by two consecutive equal signs. When SETting a DOS variable, however, don't put percent signs around it, and use only one equal sign.

If you receive an 'Out of environment space' error message, add the command **shell command.com /e:512 /p** to your CONFIG.SYS file for 512 bytes of environment space. [See the editor's note to "Sort of a Directory" in this issue's *Star-Dot-Star* column.]

Bill Weil
San Francisco Personal Computer Users Group

Let APPEND Add Power to the PATH

If you have a hard drive, you've probably used PATH, the command that tells DOS where to look for BAT, COM, or EXE files not in the current subdirectory. If a PATH command that includes your target directory is in your AUTOEXEC.BAT file, you don't have to be in the directory where an executable file resides for DOS to find and run it. But if the program you're running needs a small file containing, for example, the screen display, DOS won't be able to locate it if it has an extension like SCR or OVL. That's because PATH tells DOS only where to search for files with BAT, COM, and EXE extensions. DOS 3.2 and later versions include the APPEND command, which enables DOS searches for data files and other nonexecutable files. Place APPEND along with PATH in your AUTOEXEC.BAT file. The syntax is identical to the PATH statement's:

PATH c:\dos;c:*dir1*;c:*dir2*;d:*dir1*
APPEND c:\dos;c:*dir1*;c:*dir2*;d:*dir1*

As in the PATH statement, you should list the directories for APPEND to search in order of frequency of use. If you use word processing frequently and spreadsheets rarely, put the word processing directory first and the spreadsheet directory last. Make sure that the PATH command includes the directory (probably your DOS directory) where APPEND.EXE resides.

Francis X. Bolton
NYPC

TYPE DOS Files Using Wild Cards

Many DOS commands work with wild cards, but the TYPE command isn't one of them. Since wild cards do work with the COPY command, it's possible to get around TYPE's deficiency. Use the command **copy a*.* con** at the DOS prompt to display the contents of all files that begin with the letter *a*, for example. This scrolls each file in turn. Press **<Ctrl>-S** or **<Pause>** to freeze scrolling; press **<Ctrl>-S**, **<Enter>**, or any character key to resume. To quit, press **<Ctrl>-C** or **<Ctrl>-<Break>**.

If your system scrolls so quickly that you can't pause at the point you want, you can still scan the files if the DOS utility MORE.COM is in a directory listed in the most recently executed PATH command. Enter **<copy a*.* bigfile** to create BIGFILE, which combines all files beginning with *a* (don't duplicate a preexisting file name or you'll overwrite the file). Then enter **<more<bigfile** to get a screenful at a time. When you're done, delete BIGFILE to remove it from your hard disk.

Hy Bender
NYPC

Are you a user group member with a tip to share? Would you like to see your name in PC World, *help other users, and earn $50 plus a* PC World *T-shirt in the bargain? See How to Contact PC World, page 4.*

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Use Turbo Pascal to edit the master environment in DOS and Windows 3.0, duplicate Paradox records with a miniscript, sort directories to order, pause punctually in dBASE programs, and give the ECHO command a power boost.

Edited by Tom Swan

Mastering Your Environment

While running *Windows 3.0* in 386 enhanced mode, there's no way to modify DOS's master copy of the environment. For example, it's not possible to change the system PATH after starting *Windows*. Revising the PATH from a COMMAND window or a batch file affects only that copy of the environment; the PATH settings of other windows remain unchanged.

To get around this deficiency, I wrote EDITENV.PAS [see **LISTING 1**] for *Turbo Pascal* and Turbo Power Software's *Object Professional*. To edit an environment variable, type **editenv** *name*, where *name* is the variable in question—for example, **path** or **lib**. In order to display all variables, their settings, and the amount of unused environment space, type **editenv /d**.

Brian Foley
Scotts Valley, California

Editor's note: EDITENV's usefulness isn't limited to Windows. *The program is handy for editing environment settings from DOS too. I also use it to determine how full my environment is after booting. To compile, use* Turbo Pascal 5.5 *or* 6.0 *and a compatible version of* Object Professional.

(continues)

```
program EditEnv;
uses
  OpString, OpDos, OpCrt, OpCmd, OpSEdit;
var
  SLE : SimpleLineEditor;
  E, S : string;
  Env : EnvRec;
begin
  E := StUpcase(ParamStr(1));
  if E = '' then begin
    WriteLn('Usage: EDITENV variable name');
    WriteLn('       To edit variable name');
    WriteLn('   Or: EDITENV /D');
    WriteLn('       To display environment');
    Halt;
  end;
  MasterEnv(Env);
  if (E = '/D') or (E = '-D') then begin
    DumpEnv(Env);
    Halt
  end;
  S := GetEnvStr(Env, E);
  if S = '' then begin
    WriteLn('"', E, '" not found in environment');
    Halt(1)
  end;
  SLE.Init(DefaultColorSet);
  WriteLn('Current value: ', S);
  SLE.ReadString('New value:     ', WhereY, 1,
   127, ScreenWidth-16, S);
  if (SLE.GetLastCommand <> ccQuit) then begin
    WriteLn;
    if SetEnvStr(Env, E, S) then
      WriteLn('Environment string changed')
    else
      WriteLn('Unable to change environment');
  end
end.
```

LISTING 1: EDITENV.PAS edits the master environment in Windows 3.0. Compile with Turbo Pascal and the Object Professional library.

ANTHONY RUSSO

Miniscript Is a Big Help

When entering *Paradox* records that differ only slightly, it's easier to make several copies of one, then add unique information by editing the new records. The Ditto key (<Ctrl>-D) is great for copying one or two fields, but for entire records, this miniscript is a lot easier.

To enter the miniscript, press **<Alt>-<F10>**, select *MiniScript*, and enter **setkey -19 copytoarray a setkey -20 copyfromarray a**. Press **<Enter>** at the end of the line. The values represent key combinations: -19 for <Alt>-R and -20 for <Alt>-T. Appendix B of the PAL User's Guide lists other key values you can use.

After entering the miniscript, use *Modify Edit* to edit a data file. Move the cursor to a record you want to copy, and press **<Alt>-R**. Move to a new record, and press **<Alt>-T**. You can then move the cursor down and press **<Alt>-T** again to copy that record repeatedly.

Richard Reiter
Aptos, California

Sort of a Directory

I need to list files by name, extension, size, date, or time. To make this simple, I wrote DS.BAT [see **LISTING 2**]. The program uses the DOS SORT filter's /+n parameter to specify a beginning column for sorting.

```
@echo off
set pos=1
set fil=%1
set order=%2
if not "%2"=="" goto FIND
set order=%1
set fil=*.*
:FIND
if "%order%"=="N" set pos=1
if "%order%"=="n" set pos=1
if "%order%"=="E" set pos=9
if "%order%"=="e" set pos=9
if "%order%"=="S" set pos=14
if "%order%"=="s" set pos=14
if "%order%"=="D" set pos=24
if "%order%"=="d" set pos=24
if "%order%"=="T" set pos=34
if "%order%"=="t" set pos=34
dir %fil%|sort /+%pos%|more
```

LISTING 2: Run batch file DS.BAT to display directories sorted by name, extension, size, date, or time.

Run the program by typing **ds**, followed by an optional file specification with wild cards, and either **n** for name order, **e** for extension, **s** for size, **d** for date, or **t** for time. You may type commands in either uppercase or lowercase. For example, **ds c:\123*.wks d** lists by date all WKS files in the C:\123 directory, while **ds e** displays by extension all files in the current directory. A simple **ds** lists by name all files in the current directory.

DS.BAT uses environment variables to store file specifications and sort-key column positions. If environment space is low, the program may not work correctly.

Derek E. Houseworth
Bozeman, Montana

Editor's note: While all of DS.BAT's parameters are optional, you can't use

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the first (the file specification) without the second (the sort order). The command **ds *.bat** *will list* all *of your files by file name; for BAT files only, type* **ds *.bat n.**

If you have trouble using DS, you may have to insert a line such as SHELL=COMMAND.COM /E:512 /P in CONFIG.SYS. Change 512 to a greater number in order to reserve more bytes for environment variables. The /P option, which stands for "permanent," is needed for DOS to run AUTOEXEC.BAT.

Punctual Pauses

Pausing a dBASE program with a counter and a loop is a poor practice. A pause that's the right length on a 6-MHz AT may be too short on a 25-MHz 80386 system.

TIMEOUT.PRG [see **LISTING 3**] shows a better way to pause for a length of time. The program uses two variables: stime (the system time when the program begins its pause) and etime (the ending time when the program continues). An IF statement ensures that the delay will be no longer than about one minute. TIMEOUT executes a WHILE loop that ends when the current system time equals the calculated ending time.

```
set echo off
set talk off
stime=val(substr(time(),7,2))
etime=stime + 6
if etime > 59
 etime=etime - 59
endif
@5,5 say "A moment please..."
do while stime # etime
 stime=val(substr(time(),7,2))
enddo
@5,5 say "...Your time is up!"
```

LISTING 3: This dBASE III Plus program creates pauses that are independent of system speed.

Dan O'Brien
Rolling Hills Estates,
California

Editor's note: Enter TIMEOUT.PRG in an ASCII text file. Start dBASE, *and at the dot prompt type* **do timeout.** *The program displays a message, pauses for about six seconds, then displays a second message. For a longer or shorter pause, change the '6' in the fourth line to another number less than 60. TIMEOUT.PRG works with most* dBASE *compatibles.*

Giving ECHO a Boost

Batch file users complain justifiably about the ECHO command's slowness. The problem is most obvious in batch files that create full-screen displays.

To overcome ECHO's sluggishness, I wrote a BASIC program, MAKEMENU.BAS [see **LISTING 4**]. The program creates a COM file that displays up to 24 lines of text.

Run MAKEMENU, and either press **<Enter>** to accept the default file name MENU.COM or enter another name

(continues)

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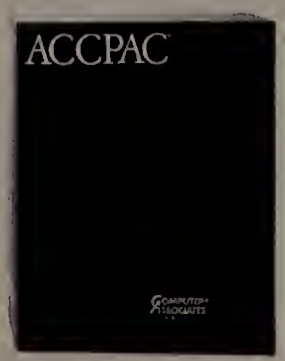

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(you don't have to enter the COM extension). Next, enter up to 24 lines of text to be displayed on screen. To enter a blank line, type a space before pressing <**Enter**>. Don't enter any dollar signs ($), as this program uses DOS function 9, which interprets that character as a string end. After pressing <**Enter**> at the end of each line, type **N** for normal display, **C** for centered, or **R** for right-justified output.

When you are through typing, press <**Enter**> at the start of a new line. You can then insert a call to the generated COM file into your batch program.

Vincent D. O'Connor
Babbitt, Minnesota

Editor's note: In addition to boosting display speed, MAKEMENU lets you display < and > characters in strings, which a batch file won't do. Also, COM files are more difficult to modify than batch files and therefore useful for displaying copyrights and disclaimers that you don't want people to change easily.

To simplify the process, store your strings in a text file similar to the sample in **FIGURE 1**. *The first line should be the COM file name you want to create. The next 24 lines are strings to display. Starting with the second line, the first character of each line should be 'N', 'C', or 'R' to format the* preceding *line. The*

```
10 DEFINT A-Z: KEY OFF: DIM LN$(24),HEADER$(9): CLS
20 FOR I = 1 TO 9: READ X: HEADER$(I) = CHR$(X): NEXT
30 LOCATE 2,31: PRINT ">>> MAKEMENU <<<": PRINT: PRINT
40 MENUNAME$ = "": NUMLINES = 1: LOCATE 5,1
50 LINE INPUT "Enter file name (default = MENU.COM): ";MENUNAME$
60 IF LEN(MENUNAME$) < 1 THEN MENUNAME$ = "MENU.COM"
70 LENGTH = 8: IF INSTR(MENUNAME$,".") > 0 THEN LENGTH = 12
80 IF LEN(MENUNAME$) <= LENGTH THEN 110
90 GOSUB 340: BEEP: LOCATE 23, 23: PRINT "Filename is too long";
100 VIEW PRINT 4 TO 6: CLS: VIEW PRINT: MENUNAME$ = "": LOCATE 5,1: GOTO 50
110 GOSUB 340: X = INSTR(MENUNAME$,".")
120 IF X = 0 THEN MENUNAME$ = MENUNAME$ + ".COM": GOTO 150
130 IF X > 0 THEN IF MID$(MENUNAME$,X) = ".COM" THEN 150
140 MENUNAME$ = MID$(MENUNAME$,1,X-1) + ".COM"
150 VIEW PRINT 6 TO 20: OPEN MENUNAME$ FOR OUTPUT AS #1
160 FOR I = 1 TO 9: PRINT #1, HEADER$(I);: NEXT
170 CLS: LOCATE 8,
175 PRINT "Enter line # " + STR$(NUMLINES) + " (Press Enter to end)"
180 LOCATE 10, 1: PRINT ">";
185 LINE INPUT LN$(NUMLINES): LNGTH = LEN(LN$(NUMLINES))
190 IF LNGTH = 0 THEN 280
200 IF LNGTH > 80 THEN LN$(NUMLINES) = LEFT$(NUMLINES,80): LNGTH = 80
210 PRINT:
215 PRINT "Position the line [N]ormally, [R]ight justified, or [C]entered: ";
220 A$ = INPUT$(1): IF INSTR("NnRrCc",A$) = 0 THEN BEEP: GOTO 220
230 IF INSTR("Nn",A$) > 0 THEN 260
240 IF INSTR("Rr",A$) > 0 THEN GOTO 257
250 LN$(NUMLINES) = STRING$(40-INT(LEN(LN$(NUMLINES))/2),32)+LN$(NUMLINES)
255 GOTO 260
257 LN$(NUMLINES) = STRING$(80-LNGTH,32) + LN$(NUMLINES)
260 LN$(NUMLINES) = LN$(NUMLINES) + CHR$(13) + CHR$(10)
270 IF NUMLINES <= 23 THEN NUMLINES = NUMLINES + 1: GOTO 170
280 FOR I = 1 TO NUMLINES: PRINT #1,LN$(I);: NEXT: PRINT #1,CHR$(36): CLOSE
290 CLS: LOCATE 12, 1: PRINT "Create another menu (Y/N) ? ";:
300 A$ = INPUT$(1): IF INSTR("YyNn",A$) = 0 THEN BEEP: GOTO 300
310 IF INSTR("Yy",A$) > 0 THEN CLS: VIEW PRINT: GOTO 40
320 VIEW PRINT: CLS: SYSTEM
340 VIEW PRINT 21 TO 24: CLS: VIEW PRINT: RETURN
350 DATA 186,9,1,180,9,205,33,205,32
```

LISTING 4: Run MAKEMENU.BAS to create a COM file that displays up to 24 lines of text.

```
testmenu.com
My Menu
C==========================
C:    1. Run a program     :
C:    2. Play a game       :
C:    3. Exit              :
C==========================
C
N
```

FIGURE 1: You can store text in a file for processing with MAKEMENU.BAS in LISTING 4.

next to last line should have only one of those three characters. 'N' must appear by itself on the last line.

If the text file is named TEST.TXT, pass it to MAKEMENU by entering **gwbasic makemenu.bas < test.txt**. *Depending on the version of BASIC you're using, you might also have to substitute BASICA for GWBASIC.*

One feature of MAKEMENU, placing blank lines in your menus, isn't possible with all versions of BASIC. With some versions, entering a space and pressing **<Enter>** *has the same effect as pressing* **<Enter>** *on its own—MAKEMENU will assume you're finished creating that menu and ask if you want to create another. In these cases, hold down the* **<Alt>** *key, type* **255** *on the numeric keypad, release <Alt>, and press* **<Enter>**.

Tom Swan is a contributing editor for PC World *and the author of* Learning C++ *and* Mastering Turbo Debugger *(Howard W. Sams, Carmel, Indiana, 1991 and 1990).*

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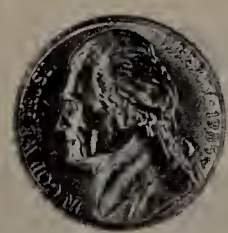
The Shell in the Shell

If the *WordPerfect Library* shell loads inside of itself, your DOS prompt will read something like '(SHELL) (SHELL) C:>', and **<F7>** won't bring back the *Library* screen. To solve the problem, type **exit** and press **<Enter>**, then press **<F7>** at the *Library* screen, repeating the process until your prompt has only one '(SHELL)'. To avoid the problem, regularly use **<F7>** rather than the SHELL command to return to the *Library*.

Glen A. Young
Renton, Washington



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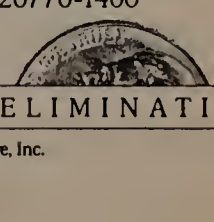

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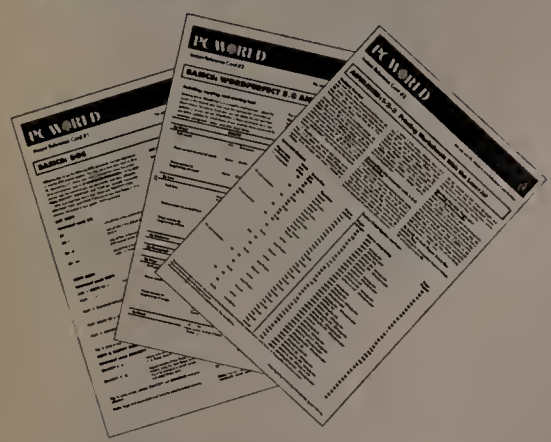

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Instant Reference Card #10

For use with PC World Instant Reference Card Portfolio

BASICS: 1-2-3 RELEASE 3.1

What to do: As a general rule, move the cursor or pointer to the first cell referenced by a command before issuing the command. Menu commands begin with a /; the first letter of each option is in bold, as in **/W**orksheet **I**nsert **R**ow. To execute the command, you need only type the / and the first letter of each option—for example, **/wir**. To get help, press **<F1>** in Ready mode. To quit *1-2-3*, save all files, and then press **/Q**uit **Y**es.

USING MENUS

Display the main menu	/ or < in Ready mode
Display Add-in menu	**<Alt>-<F10>** in Ready mode
Select highlighted option	**<Enter>**
Select option	Type first character of option
One option left/right	**<Cursor Left>/<Cursor Right>**
First option on left	**<Home>**
Last option on right	**<End>**
Return to Ready mode	**<Ctrl>-<Break>**
Return to previous menu	**<Esc>**

GETTING AROUND

Go to address, range, or file	**<F5>**
Move between windows	**<F6>**

Fold Here

Single Worksheet

Right/left one column	**<Cursor Left>/<Cursor Right>**
Up/down one row	**<Cursor Up>/<Cursor Down>**
Right/left one screen width	**<Ctrl>-<Cursor Right>** or **<Tab>/<Ctrl>-<Cursor Left>** or **<Shift>-<Tab>**
Up/down one screen length	**<Page Up>/<Page Down>**
First cell next to blank cell	**<End>**, then **<Cursor Up>**, **<Cursor Left>**, **<Cursor Down>**, or **<CursorRight>**
Last nonblank cell	**<End><Home>**
Cell A1	**<Home>**

Multiple Worksheets

Next sheet	**<Ctrl>-<Page Up>**
Previous sheet	**<Ctrl>-<Page Down>**
First cell next to blank cell	**<End><Ctrl>-<Page Up>** or **<End><Ctrl>-<Page Down>**
Last nonblank cell	**<End><Ctrl>-<Home>**
Cell A:A1	**<Ctrl>-<Home>**

Note: When you move from one worksheet to the next in full-screen view, the pointer returns to the cell last highlighted in the destination sheet. In perspective view, the pointer moves to the same row and column location in each worksheet.

Multiple Files

Next file	**<Ctrl>-<End><Ctrl>-<Page Up>**
Previous file	**<Ctrl>-<End><Ctrl>-<Page Down>**
Last active file	**<Ctrl>-<End><End>**
First active file	**<Ctrl>-<End><Home>**

Note: Across files, the pointer returns to the cell last highlighted in the destination sheet. An active file is one in memory; an inactive file is one on disk.

ENTERING INFORMATION

Left-aligned labels	Begin with ' (apostrophe)
Right-aligned labels	Begin with "
Centered labels	Begin with ^
Labels repeated to fill cell	Begin with \
Labels hidden when printed	Begin with |
Display range names	**<F3>**
Make address absolute	Enter address, **<F4>** (keep pressing **<F4>** for variations)

Note: To enter values, begin with a number or arithmetic signs.

EDITING A CELL

Start editing	**<F2>**
End editing	**<Enter>**
Delete character to the right	**<Delete>**
Delete character to the left	**<Backspace>**
Erase the edit area	**<Esc>**
Left end of entry	**<Home>**
Right end of entry	**<End>**
Five characters left	**<Shift>-<Tab>** or **<Ctrl>-<Cursor Left>**
Five characters right	**<Tab>** or **<Ctrl>-<Cursor Right>**
Toggle insert/overtype modes	**<Insert>**

Fold Here

WORKING WITH RANGES

Select a range	Move to starting cell, **<P**eriod**>**, move to ending cell, **<E**nter**>**
Copy or move a range	**/C**opy or **/M**ove, specify source range, specify destination range
Erase a range	**/R**ange **E**rase, specify range
Define range name	**/R**ange **N**ame **C**reate, enter name, specify range
Using range names	**<F3>**, select name
Change formulas to numbers	**/R**ange **V**alue, specify source range, specify destination range
Fill range with series of values	**/D**ata **F**ill, specify range, enter start value, enter increment, enter last value

Note: A range is a rectangular area that can be a single cell, a row, a column, or a block of cells.

FILE HANDLING

Retrieve file replacing current	**/F**ile **R**etrieve, specify path and file name
Save file the first time	**/F**ile **S**ave, specify path and file name
Save file replacing copy on disk	**/F**ile **S**ave, **<Enter>**, **R**eplace
Open file before/after current	**/F**ile **O**pen **B**efore/**A**fter, specify path and file name
Combine file with current	**/F**ile **C**ombine **C**opy **E**ntire-file/**N**amed-range, specify file/range and file
Add/subtract file to current	**/F**ile **C**ombine **A**dd/**S**ubtract **E**ntire-file/**N**amed-range, specify file/range and file
Import text file to current	**/F**ile **I**mport **T**ext/**N**umbers, specify path and file name
Create new worksheet file	**/F**ile **N**ew **B**efore/**A**fter, specify path and new file name

Tip: To see a screenful of file names to choose from, press **<F3>** when prompted to select a file.

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ADVANCED: 1-2-3 RELEASE 3.1

CHANGING THE WORKSHEET

Undo last change	**<Alt>-<F4>**
Delete row, column, sheet, or file	**/Worksheet Delete Row, Column, Sheet, or File**; specify range or file
Erase worksheet	**/Worksheet Erase Yes**
Recalculate worksheet	**<F9>**
Set width of columns	**/Worksheet Column Column-range, Set-width**, specify range, enter width
Insert row(s)/column(s)	**/Worksheet Insert Row/Column**, select range (one row or column for each to be inserted)
Insert sheet(s)	**/Worksheet Insert Sheet Before/After**, enter number of sheets
Freeze row(s)/column(s)	Position pointer below and to right of area to freeze, **/Worksheet Titles Horizontal/Vertical/Both**
Unfreeze row(s)/column(s)	**/Worksheet Titles Clear**
Hide/display column(s)	**/Worksheet Column Hide/Display**, specify range
Display hidden columns or sheets	**/Worksheet Hide Enable/Disable**, specify range

WORKING WITH DATA BASE TABLES

Sort data base table or range	**/Data Sort Data-range**, select range, **Primary-key**, specify key, **Ascending Go**
Extract records from data base	**/Data Query Input**, select range, **Output**, select range, **Criteria**, select range, **Extract**
Find records in data base	**/Data Query Input**, select range, **Output**, select range, **Criteria**, select range, **Find**
Repeat last Data Extract Find	**<F7>**
Repeat last Data Table	**<F8>**

LINKING EXTERNAL FILES

Link to external worksheet	To reference range TAX in C:\BUD\QTR1.WK3 use: **+<<C:\BUD\QTR1.WK3>>$TAX**
Link to external data base	**/Data External Use**, select driver ("Sample" is dBASE), specify path, specify file name, specify range name, **Quit**
List fields in external data base	Link to external data base, **/Data External List**, specify data base table, specify range

Fold Here

Fold Here

FORMATTING

Format numbers and formulas	**/Range Format**, select format, specify range
Format text	**/Range Label**, select alignment, specify range
Remove formatting	**/Range Format Reset**, specify range

Tip: You can change the font for an entire print range with **/Print Printer Options Advanced Fonts**. For a single cell, you need to use the WYSIWYG add-in.

PRINTING

Print range	**/Print Printer Range**, select range, **Go**
Change right margin	**/Print Printer Options Margins Right**, enter number
Enter header/footer	**/Print Printer Options Header/Footer**, enter header/footer
In header/footer	Use **@** for date, **#** for page, **|** for section, **** for cell address
Change to landscape printing	**/Print Printer Options Advanced Layout Orientation Landscape**

GRAPHING

Select a type of graph	**/Graph Type**, select type
Select range of x-axis labels	**/Graph X**, specify range
Select range(s) to plot	**/Graph A**, specify range, **B**, specify range, and so on
Display current graph	**<F10>** or **/Graph View**
Add title	**/Graph Options Titles First**, enter title
Add legend for all ranges	**/Graph Options Legend Range**, specify range
Name graph	**/Graph Name Create**, enter name
Use a different graph	**/Graph Name Use**, enter name
Print current/named graph	**/Print Printer Image Current/Named-graph**, enter name if necessary, **Go**

Extract from external data base	Link to external data base, **/Data Query Input**, specify input range, **Output**, specify output range, **Criteria**, specify criteria range, **Extract**

Note: An external file is any file other than the one you are working on; it may be on disk or in memory.

WORKING WITH WINDOWS

Split screen at cursor	**/Worksheet Windows Horizontal/Vertical**
Display three stacked sheets	**/Worksheet Windows Perspective**
Restore to full-screen view	**/Worksheet Windows Clear**
Sync/unsync scrolling windows	**/Worksheet Windows Sync or Unsync**
Display graph in right-hand column(s)	Move pointer out of leftmost column, **/Worksheet Windows Graph**

USING WYSIWYG

What to do: Load WYSIWYG and assign it to **<Alt>-<F9>** with **<Alt>-<F10> Load**, select WYSIWYG.PLC, **3 Quit**

Specify height of rows	**<Alt>-<F9> Worksheet Row Set-height**, specify range, enter height in points
Change font of individual cells	**<Alt>-<F9> Format Font**, select font, specify range
Make worksheet range bold	**<Alt>-<F9> Format Bold Set**, specify range
Add current graph to worksheet	**<Alt>-<F9> Graph Add Current**, specify range to hold graph, **Quit**
Print worksheet range	**<Alt>-<F9> Print Range Set**, specify range, **Go Quit**
Change display to 150%	**<Alt>-<F9> Display Zoom Huge Quit**
Copy format(s) between ranges	**<Alt>-<F9> Special Copy**, specify source range, specify destination range

For use with PC World Instant Reference Card Portfolio

DEVELOPER'S TOOLBOX

No-Stall Install

Tom Swan

The current rage in computer-book publishing is to slip a disk inside a book's back cover. Although the disk raises the book's price, on-line files make up for the extra cost and save readers the hassle of typing long listings.

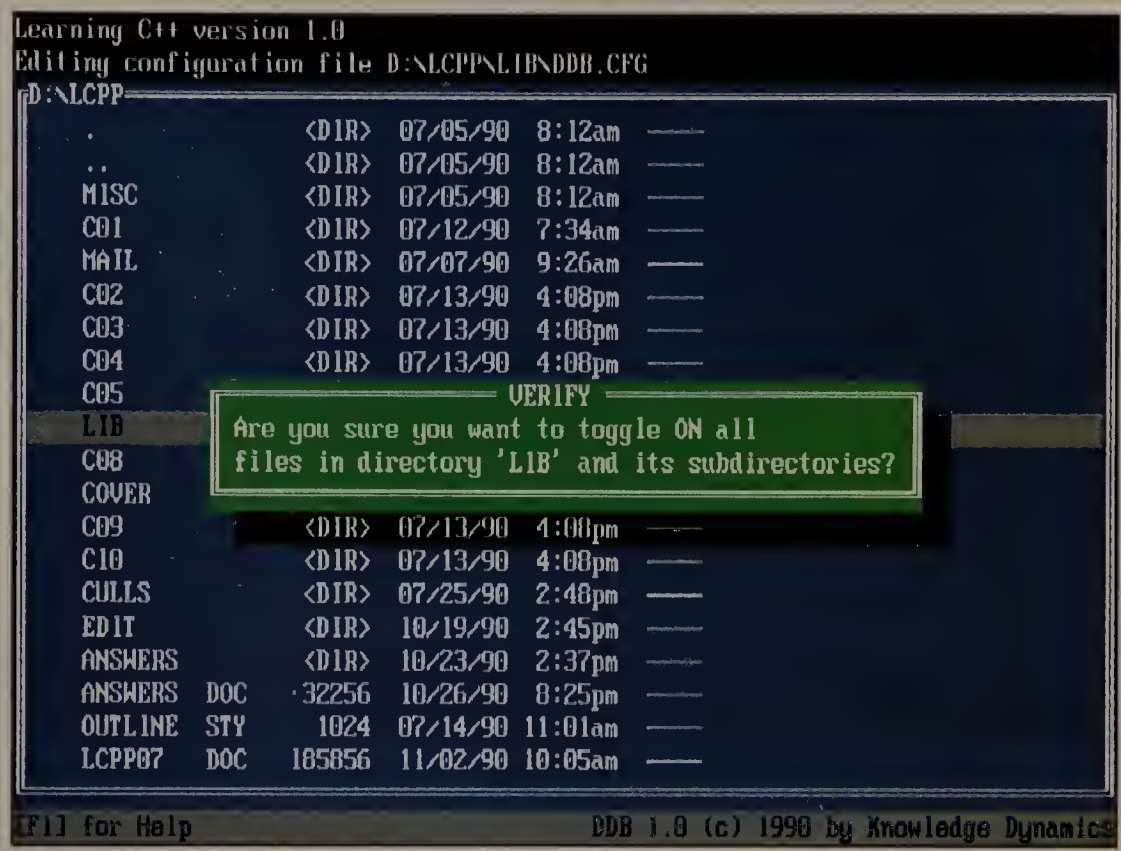
But I had other hassles to contend with when I realized that my newest book would need three disks to store the *VDE* shareware editor and a version of *Zortech C++*, in addition to listings. The publisher had planned for only two disks. I was in trouble, and I had only a few weeks to find a solution.

I needed a program to compress my files and later decompress them on readers' systems. The program had to manage subdirectories and optionally modify AUTOEXEC.BAT and CONFIG.SYS. In short, I needed a software installation tool kit, and that's exactly what I found.

I had heard of *Install Professional* by Knowledge Dynamics, and I decided to try it. This is a bundle of two programs, *Install* and *ddb* (*Distribution Disk Builder*); they're sold separately, but you'll save money by buying them together in the Professional version.

ddb automates installation-script creation, helping you prepare your disks for distribution. You merely select files and directories, and the program compresses and copies those files to floppy disks, creating an ASCII script for directing the installation process on end users' computers. Your customers simply insert a floppy into drive A: and type **a:install**, and INSTALL.EXE executes the prepared script.

For new scripts, you can use *ddb* to generate stock commands, or you can modify a supplied sample script. You can also write scripts from scratch. You'll probably need to customize the stock script generated by *ddb*, but that's not difficult. I was able to master *Install*'s simple but capable script language in a few hours.



Install's distribution builder, ddb, generates an installation script for selected files and directories.

The language's many features for creating subdirectories, designing good-looking displays, and performing other custom installation chores are welcome, but the winning ingredient for me was *Install*'s file compressor. Although file-compression utilities are nothing new, I like *Install*'s built-in capability. I managed to stuff all my files onto two disks with room to spare. During end-user installation *Install* performs an integrity check on files to guard against data errors and viruses.

Install has its own copyright-displaying start-up banner, which you may want to replace with your own. Since the product comes with C source code, you can do this easily (and legally) by deleting the banner and recompiling the code. But that causes INSTALL.EXE to grow by 20K, taking up space gained during compression. Knowledge Dynamics has another product, *Executrix*, which solves that problem. This program compresses EXE files yet still lets people run them, so long as the programs don't use overlays.

Install helped me survive my mad dash to a deadline. Better still, the program has given my disks the professional look and feel of a first-class automated installation. This is one tool kit I wish I had discovered years ago.

Let's talk it over. My MCI Mail handle is TSWAN; my CompuServe ID is 73627,3241. ●

WHERE TO BUY

Install Professional
Knowledge Dynamics Corp.
Hwy. Contract 4 Box 185-H
Canyon Lake, TX 78133-3508
800/331-2783, 512/964-3958 (fax)
LIST PRICE: Install Professional $399.95; Install $249.95; ddb $150; Executrix $69.95
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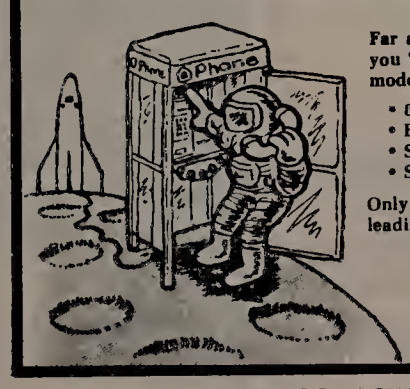

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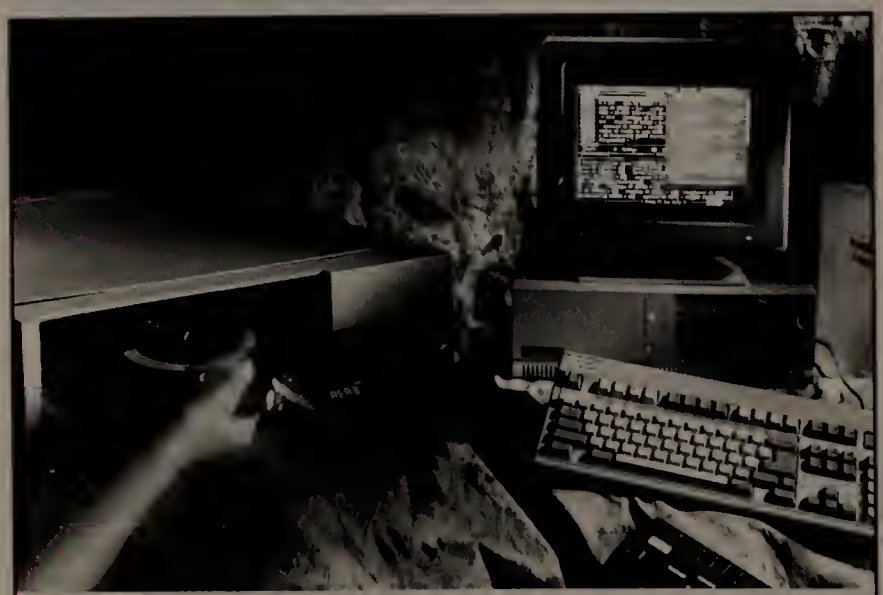

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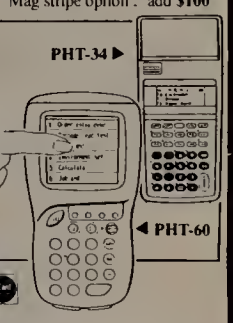

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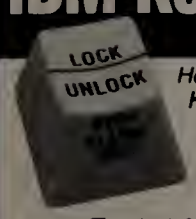

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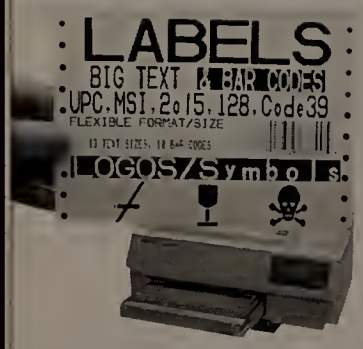

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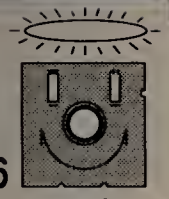

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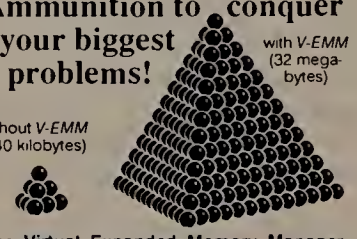

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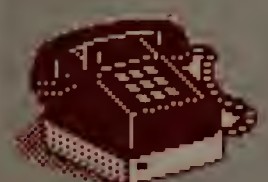

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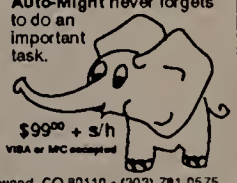

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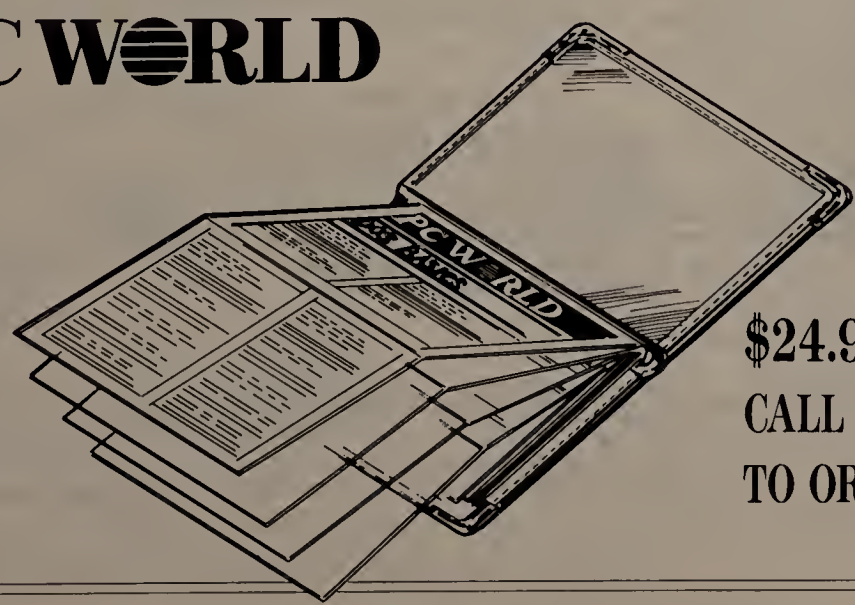

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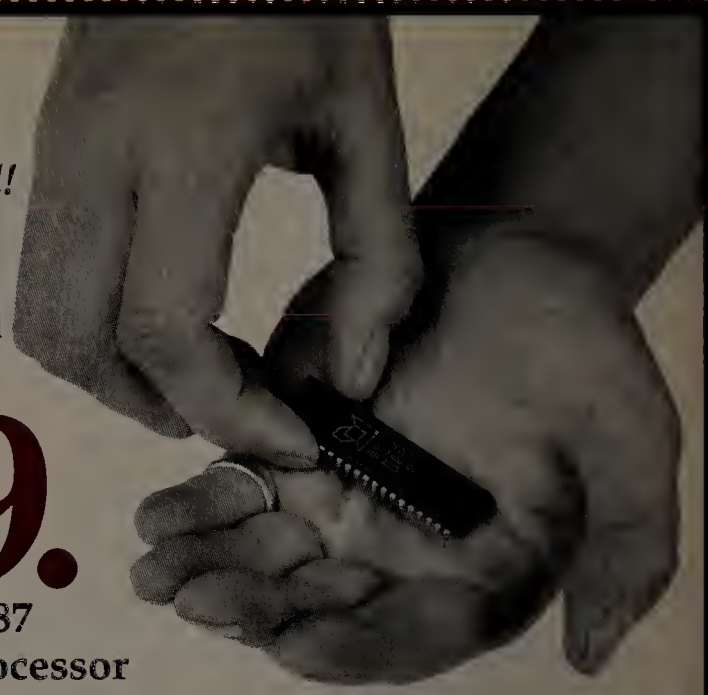

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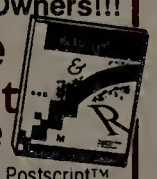

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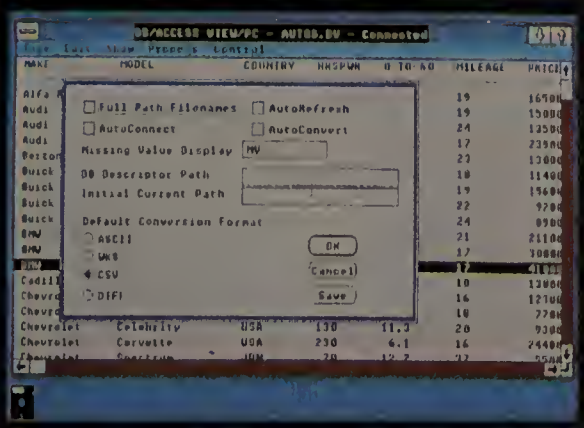

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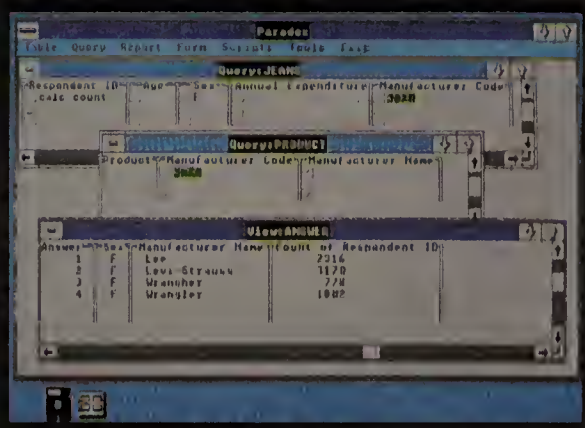

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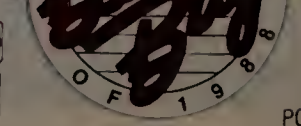

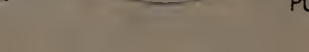

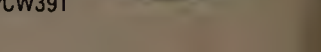

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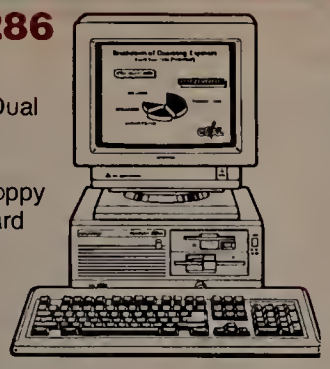

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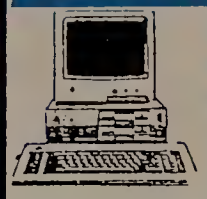

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6450372	2MG Memory Adapter 6450367	1,295.00	395.00
6450603	1MG SIMM PS/2 70-E61; 121	450.00	82.00
6450604	2MG SIMM PS/2 50-70	950.00	129.00
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34F2933	4MB SIMM PS/2 55SX; 65SX	2,195.00	420.00
6450375	1MG Memory BD PS/2 80-041	675.00	96.00
6450379	2MG Memory Bd PS/2 80 111-321	950.00	179.00
6451060	4MG Mem Bd PS/2 80-A21; A31	1,895.00	479.00
6450605	2-8MG Mem Xpand PS/2 70&80 w/2MG	1,295.00	399.00
34F3077	2-14MG MemXpand PS/2 70&80 w/2MG	1,295.00	498.00
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N/A	2MG Module Mac Portable	2,095.00	690.00
N/A	3MG Module Mac Portable	3,095.00	1,049.00
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MD218	1MG Kit Mac II, IIX, IICX	250.00	99.00
MD219	2MG Kit Mac II, IIX, IICX	450.00	118.00
MD292LL-A	4MG Kit Mac IICI	950.00	275.00
N/A	16MG Kit Mac IICI	6,990.00	1,499.00
M0376LL-A	4MG Kit Mac IIFX	950.00	294.00
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M6005	1MG Memory Xpand Apple Laser Witer II-NTX	450.00	118.00
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PC14-PA8311U	1MG Memory Card Portable T1000SE-XE	650.00	275.00
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PC15-PA8308U	2MG Memory Card Portable T3100SX	950.00	189.00
PC15-PA8310U	4MG Memory Card Portable T3100SX	4,395.00	589.00
PC6-PA7137U	3MG Memory Card Protable T3200	1,590.00	299.00
PC7-PA8301U	2MG Memory Card Portable T5100	1,190.00	189.00
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500510-001	512 Upgrade AST Premium 286-Fastram	155.00	54.00
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500510-033	1MG Upgrade AST Premuim 386, RPPLUS MC Advantage 386	260.00	99.00
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500510-008	4MG Upgrade AST Premium 386C, 386-16 W.S., 386SX, FastBd/386, Adv Fastram, RP 286	675.00	299.00
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500510-011	128KB Upgrade Astbravo 286	50.00	26.00
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117081-002	2MG Memory Bd Portable LTE 286	1,250.00	190.00
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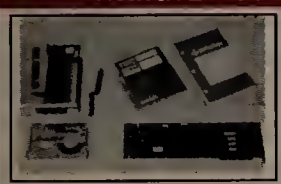

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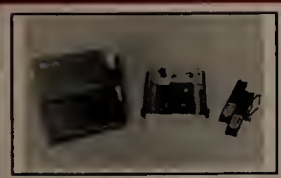

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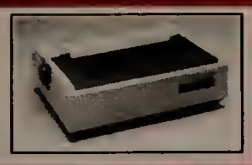

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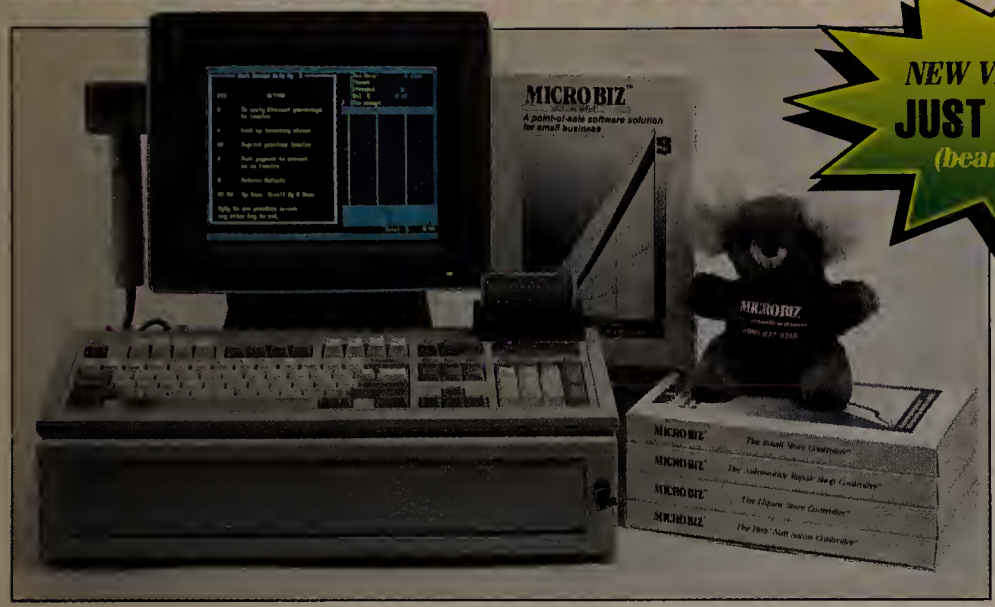

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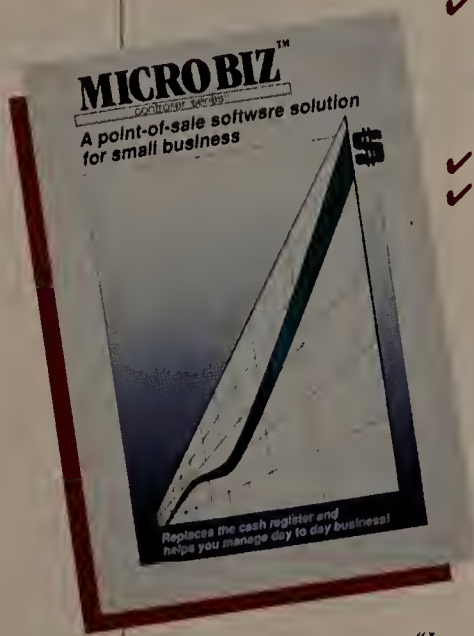

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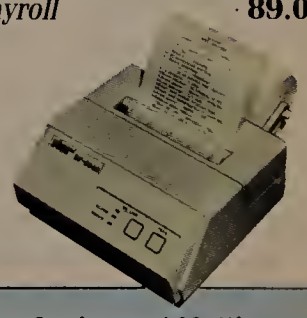

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TAKING IT HOME

The practical guide to home/office computing

Getting straight in an ergonomic office

Steve Bass

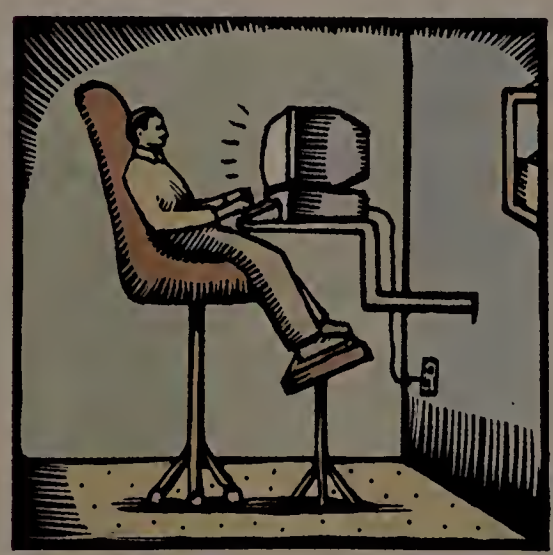
Like most of you, I spend a large part of my day sitting at the computer. After a full day with my nose to the grindstone, my shoulder to the wheel, and my fingers at the keyboard, boy, does my back hurt—and my wrists too! Seriously, years of staring at a CRT day in and day out have resulted in minor and not-so-minor aches and pains, not the least of which is neck and shoulder pain from typing scrunched up with a telephone cradled next to my ear.

Being self-employed, I can't go to the labor relations board. Instead, I talked with a registered physical therapist and started experimenting with ergonomically designed office equipment. I learned plenty about chair design, keyboard height, and screen glare.

Most of us use any old chair—usually one too low and unadjustable. Big mistake. Industrial psychologist Paul Cornell explains that "ergonomic seating should support the back in its natural curve, distribute the body's weight evenly, and minimize pressure on the thighs behind the knees." You should look down at the monitor at about a 20-degree angle. The old, wooden clunker I used for years was so low that, even when sitting on pillows, I was looking up at the computer.

I tried Pos-Chair, a chair engineered specifically for computer users. It's expensive—I paid $700, and they run as high as $1200—but I felt a difference after the first day, and my physical therapist gives it a firm nod of approval. You don't have to spend a grand to get a chair with adjustable seat height and backrest—preferably with lower back support—and small, unobtrusive armrests. Make sure the seat of the chair supports most of your thighs and keeps them horizontal to the floor.

A footrest can help you sit in the right position and can relieve lower back pain



RANDY LYHUS

by keeping hamstring muscles and Achilles tendons stretched. Some footrests even have textured surfaces for massaging the bottoms of your feet to promote good circulation. And in any chair—like Mom always said—don't slouch!

Most keyboards keep your wrists bent upward. Combined with repetitive keystrokes, that can cause carpal tunnel syndrome—chronic pain in the hand and wrist. Keep the keyboard 29 to 31 inches from the floor, and take periodic breaks.

Silicon Sports' Wrist Pad—a 20-by-4-inch neoprene cushion—provides inexpensive support, but my favorite is CTS-Pillow, a wrist support and platform that lets you hold the keyboard on your lap at an ergonomically correct height without having to adjust your chair.

Monitor glare increases fatigue and vision difficulties. Most manufacturers try to diffuse the light from their displays to cut down on reflection, but the process also blurs line edges. Trying to focus on these fuzzy images causes eyestrain and headaches. Older antiglare screens can make displays darker; newer technology not only eliminates that but also provides better contrast. Try different products before you buy.

My own biggest pain in the neck—literally—came from cradling a phone between my ear and shoulder. My therapist's staff uses lightweight telephone headsets, and now, so do I. I just plug one into my phone instead of using the handset, and I'm astonished at how much easier it is to type notes with my shoulder free.

As you can see, creating an ergonomically correct home office will cost you a few bucks. It's your money. And it's your body.

Steve Bass is a contributing editor for PC World.

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1. Which products are you most interested in?
☐ 286-based systems ☐ UNIX®-based systems
☐ 386-based systems ☐ Laptops
☐ 386SX-based systems ☐ Other: _____
☐ 486-based systems

2. Are you interested in computer products for:
☐ Home ☐ Business ☐ Resale

3. How many PCs does your company plan to purchase in the next twelve months?

Quantity	Timeframe	Quantity	Timeframe
_____	Less than 1 month	_____	6-12 months
_____	1-3 months	_____	More than 12 months
_____	3-6 months		

4. What do you plan to use computer products for?
_____
_____
_____

5. How many PCs do you have installed now at your company?
_____

6. Are you interested in leasing? ☐ Yes ☐ No

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